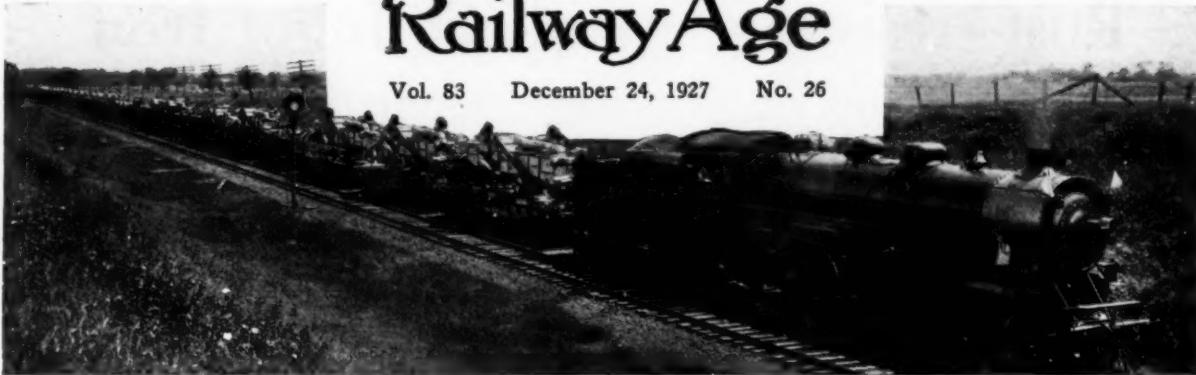


Railway Age

Vol. 83 December 24, 1927 No. 26



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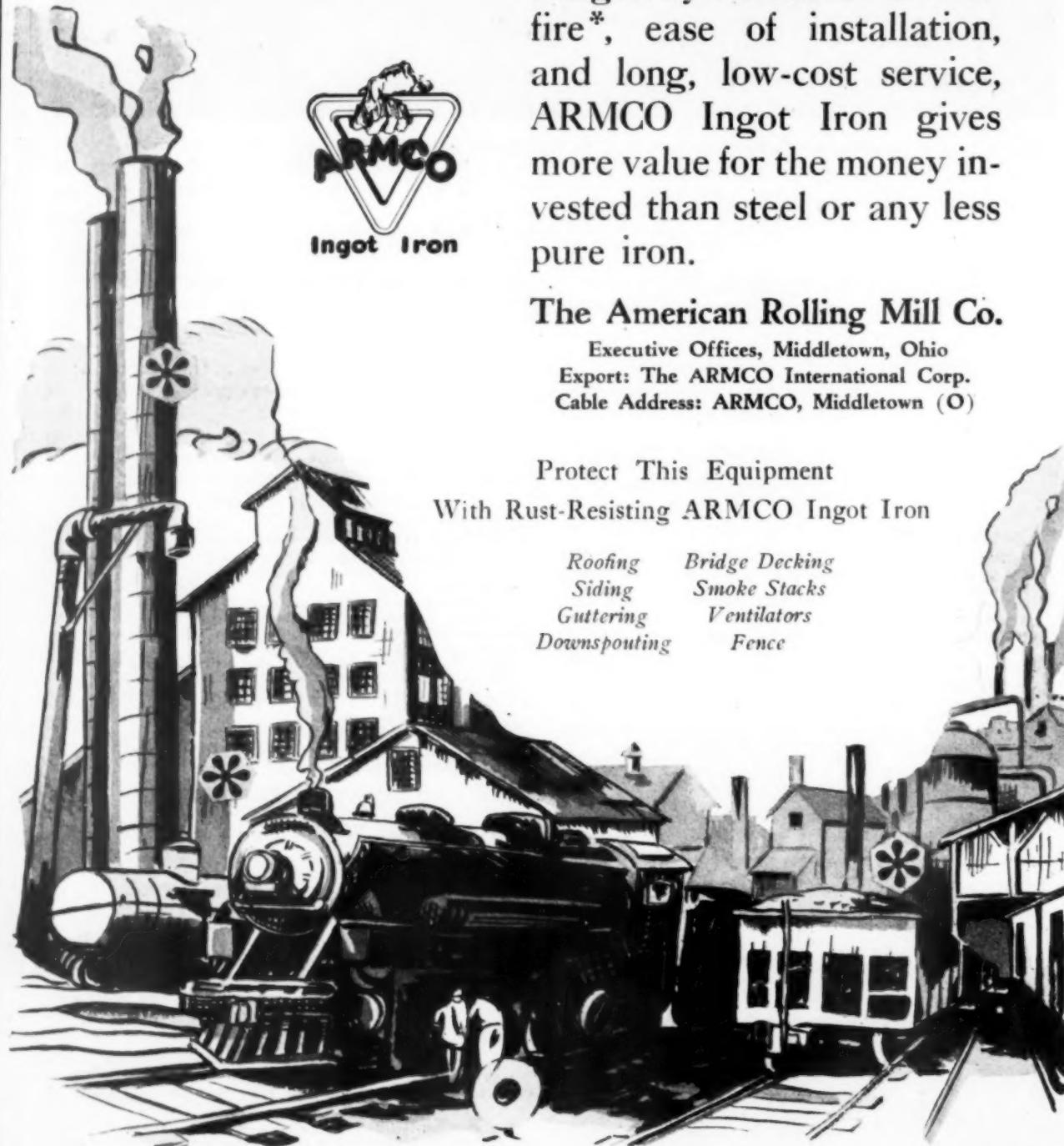
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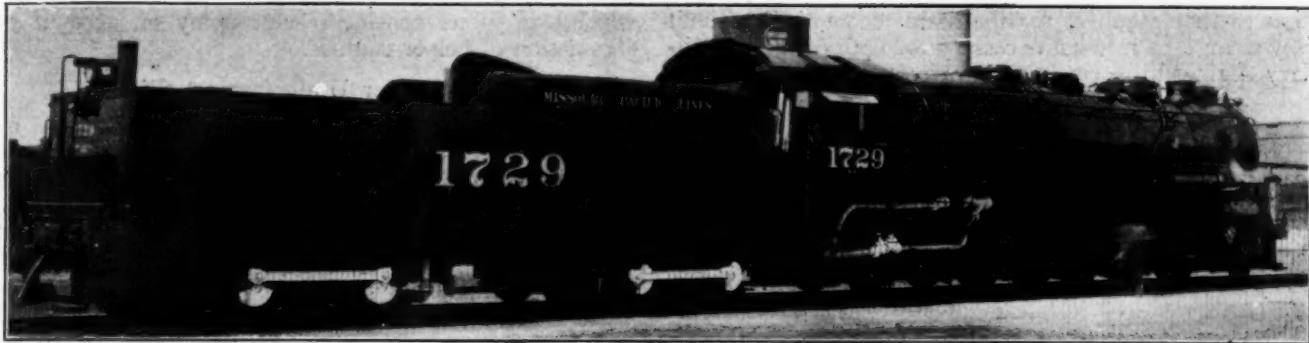
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Santa Fe type locomotive equipped with six-wheel power tender trucks and used in heavy switching service at the Dupo, Ill., yard of the Missouri Pacific

Mo. Pac. Tests Power Tender Trucks

Application to large power in heavy hump yard service gives from 30 to 37 per cent increased tractive effort

DURING the early part of 1927, the Missouri Pacific was faced with the problem of providing additional unit motive power capacity to meet the demands of heavy duty hump yard switching service at Dupo, Ill., and it was decided to secure this increased capacity by the application of steam driven power trucks under the tenders. A 2-8-8-2 type and a 2-10-2 type locomotive were accordingly selected and equipped with new large capacity tenders, each having two six-wheel power tender trucks, or auxiliary locomotives as they are known, furnished by the Bethlehem Steel Company, Bethlehem, Pa. The trucks in question are essentially the same as those described on page 320 of the *Railway Age* of August 15, 1925, having 10-in. by 12-in. cylinders, 36-in. wheels and a gear ratio of 2.25, but in this case, each truck has six wheels, four of which transmit power. With the installation of these trucks the Missouri Pacific becomes the first railroad to propose and place in service two six-wheel auxiliary locomotives under one tender.

Dupo yard, the classification terminal for the Illinois division of the Missouri Pacific embracing the Southern Illinois coal mining district, is subject to peak movements over long sustained periods during the coal loading season. The northbound movement over the hump consists of heavy coal trains from the South, and the gradient in this movement ranges from .17 per cent at the foot to 2.2 per cent at the apex of the hump. The southbound movement consists of merchandise load and empty coal cars for the South, and the gradient in this movement ranges from zero at the foot to 2.3 per cent at the apex of the hump.

Two Solutions of the Problem

Two ways were open to secure an increase in the number of cars handled over the hump: First, increase the trackage facilities on the hump, which was not desirable and which would seriously hamper switching operations while construction was under way; and second, secure additional capacity in the pusher locomotives serving the hump, which would considerably increase car handlings and would also result in economies in operation due to faster movement of cars to the point where hump switching began.

The second way was decided to be the one most suited to the local operating needs. Locomotive 4000 having the following characteristics was selected to handle the movement on the northbound hump:

Type	Mallet
Wheel arrangement	2-8-8-2
Weight on drivers	414,800 lb.
Weight on truck	18,600 lb.
Weight on trailer	19,600 lb.
Weight of engine	453,000 lb.
Weight of tender	305,500 lb.
H.P. cylinders, diam. and stroke	.26 in. by 32 in.
L. P. cylinders, diam. and stroke	.40 in. by 32 in.
Diameter, drivers	.55 in.
Diameter, engine truck wheels	.30 in.
Diameter, trailer wheels	.30 in.
Diameter, tender truck wheels	.36 in.
Tractive force	200 lb.
Boiler pressure	.94,400 lb.
Grate area	.84.8 sq. ft.
Firebox, width and length	.96 in. by 126 in.
Heating surface, superheater	.890 sq. ft.
Heating surface, firebox	.252 sq. ft.
Heating surface, tubes	.3216.2 sq. ft.
Heating surface, flues	.1088.56 sq. ft.
Heating surface, feed water heater	.1,240 sq. ft.
Heating surface, arch tubes	.32 sq. ft.
Heating surface, total	.5828.76 sq. ft.
Fuel	Coal

Locomotive 1729 having the follow characteristics was selected to handle the movement on the southbound hump:

Type	Santa Fe
Wheel arrangement	2-10-2
Weight on drivers	329,500 lb.
Weight on truck	29,350 lb.
Weight on trailer	60,100 lb.
Weight of engine	418,950 lb.
Weight of tender	305,500 lb.
Cylinders, diam. and stroke	.30 in. by 32 in.
Diameter, drivers	.63 in.
Diameter, truck wheels	.33 in.
Diameter, trailer wheels	.43 in.
Diameter, tender truck wheels	.36 in.
Tractive force	81,600 lb.
Boiler pressure	.210 lb.
Grate area	.88 sq. ft.
Firebox, width and length	.96 1/4 in. by 132 3/4 in.
Heating surface, superheater	1,285 sq. ft.
Heating surface, firebox	.265 sq. ft.
Heating surface, tubes	.3,120 sq. ft.
Heating surface, flues	1,466 sq. ft.
Heating surface, siphons and arch tubes	105 sq. ft.
Heating surface, combustion chamber	120 sq. ft.
Heating surface, total	5,076 sq. ft.
Fuel	Coal

After a careful study of the conditions and requirements for steam used by the engine and auxiliary locomotives, a check of the boiler capacity was made and it was found that the present boilers would be able to supply enough steam for the two additional engines in addi-

tion to that required for the main locomotive, without any change, as it is not necessary for both of these auxiliary engines to be cut in for any great length of time.

New Tenders Built for Both Locomotives

New tenders were built for both locomotives, each having a capacity for 18 tons of coal and 14,000 gallons of water. They were equipped with Bethlehem auxiliary locomotives on both the front and rear trucks which increased the available tractive effort on each locomotive as follows: The tractive effort of locomotive No. 4000, which carries 200 lb. steam pressure, was raised from 94,400 lb. to 122,400 lb., or an increase of 28,000 lb. The tractive effort of locomotive No. 1729, which carries 210 lb. steam pressure, was raised from 81,600 lb. to 111,600 lb. or an increase of 30,000 lb.

These two locomotives are now operating on the Dupo, Ill., hump, and although actual figures on their performance are not yet available due to the fact that traffic from the Southern Illinois coal fields has not been of sufficient volume thus far to permit operation at maximum capacity over a 24-hour period, the locomotives have demonstrated conclusively their ability to handle increased tonnage on the hump and have more than met expectations along this line.

Locomotives of similar class to locomotive 1729 have a capacity of 3,000 actual tons in a southward movement over the hump. Since the application of double-power tender trucks Locomotive No. 1729 has demonstrated its ability to handle from 4,500 to 5,000 actual tons on a southward movement over the hump.

Tractive Effort Increased

While the available tractive effort of locomotive No. 4000 was increased approximately 30 per cent and on locomotive No. 1729 approximately 37 per cent, the capacity of both locomotives in tons handled over the hump increased 50 per cent. This is due to the longer trains which permit the locomotive and some of the cars to be on the level or on a very light grade at the bottom of the hump, at the time the first cars are being pushed over.

In the past, during the coal loading season, it has been necessary in order to handle the entire train brought into the yards by the road engine to use a helper locomotive for 24-hour service on the hump, or else take the trains up in two cuts which caused considerable congestion in the yard.

Both locomotives No. 4000 and No. 1729 have demonstrated their ability to take the heaviest trains brought into their yards over the hump without helper service,

which will effect considerable economy on account of elimination of helper engines.

Special Tender Underframes—Piping

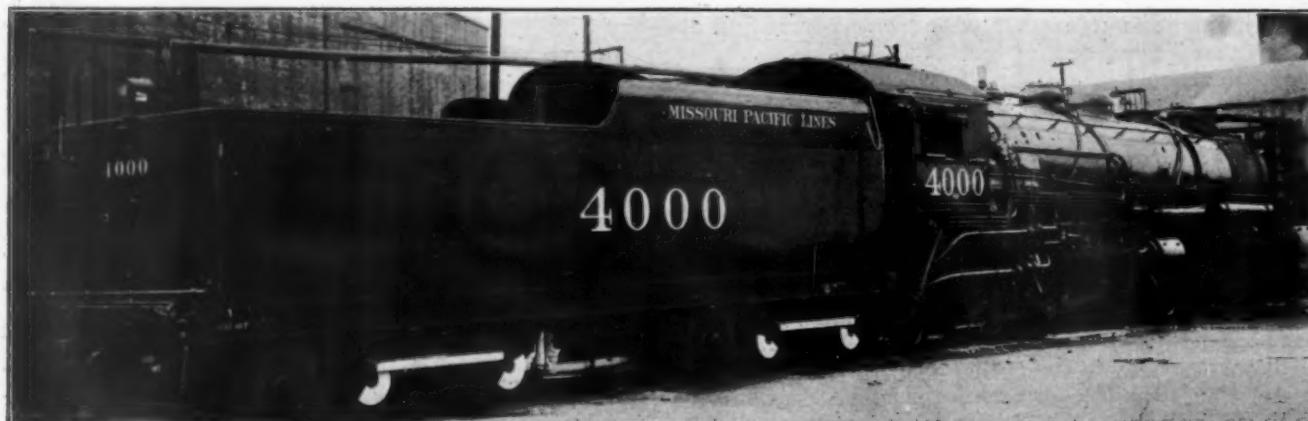
The tender underframes were especially developed by the Commonwealth Steel Company, St. Louis, Mo., to accommodate this double installation and the tenders were built new by the Missouri Pacific with the idea in mind of providing sufficient water capacity to keep the locomotives in service during the full eight-hour shift. The piping application consists of a single pipe line running from suitable connections to the right and left steam pipes back to a Y-fitting at the forward end of the firebox and then branching into two independent 3-in. steam lines extending further back to the auxiliary locomotives. Two special Bradford throttle valves with a single operating handwheel conveniently placed in the locomotive cab, control the flow of steam. Gate valves permit shutting off steam to either line should the operation of one of the auxiliary locomotives be undesired for any reason.

The piping under the tender consists of the two 3-in. steam lines suitably connected from the steam pipe leads on the locomotive to the auxiliary engine on each of the trucks.

Two 3½ in. exhaust pipes conduct the exhaust steam from these engines to two lengths of 10-in. vertical steel pipe which serve both as up-takes through the body of the tank and as mufflers. In order to provide complete flexibility of the tender trucks in negotiating curves 3-in. Barco flexible joints, especially designed for this installation, are provided. In the exhaust lines, flexibility is secured by the use of 3½-in. Barco joints, also of special design. The two ¾-in air lines to the cylinder cocks are also provided where necessary with flexible metallic joints. In addition to the provision of air-operated cylinder cocks in the auxiliary locomotive cylinders, automatic drip cocks located at the lowest points in the steam lines serve to release condensed water. All of the large piping used is of extra heavy weight. Valves and fittings are designed for high pressures. Steam lines are carefully lagged.

Operation Is Readily Controlled

The operation of the auxiliary locomotives is wholly under the control of the engineman, approximately two turns only of the special throttle valve handle being required for complete throttle opening. The auxiliary locomotive automatically goes into engagement upon the opening of the throttle valve and disengages upon the closing of the throttle valve.



Mallet Locomotive with Large Capacity Tender and Six-Wheel Power Tender Trucks Used at the Missouri Pacific Hump Yard, Dupo, Ill.

"Alternative Plan" for Depreciation Criticized

By W. G. Edmondson
Assistant Engineer Motive Power, Reading Company

I HAVE read with interest the articles in the *Railway Age* issues of November 12 and 19, describing the so-called "alternative plan" for depreciation accounting proposed at the I. C. C. hearing by J. W. Roberts, president of the Roberts-Pettijohn-Wood Corporation, Chicago, which is sponsored by the National Industrial Traffic League and the National Council of Traveling Salesmen's Associations.

Certain features of the plan for depreciation accounting proposed by Mr. Roberts appear to be similar to the plan outlined in the commission's depreciation order No. 15100. It is noted, however, that the author employs somewhat different terms in describing his method of procedure. The application of the commission's depreciation order hinges, to a large extent, upon the manner of handling and accounting for the cost of "extraordinary repairs." In Mr. Roberts' plan, we find the term "restorative repairs" is used, which appears synonymous with "extraordinary repairs" as used in the commission's order.

I have been unable to distinguish any essential difference between the plan outlined by Mr. Roberts and the depreciation order in its treatment of "extraordinary repairs." Mr. Roberts' plan would, therefore, be subject to the same criticism as that directed against the depreciation order; namely, that this feature of his plan is impracticable and would result in an unwarranted expense and burden on the carriers and rate-payers.

As provided for in the depreciation order, we find that Mr. Roberts classifies maintenance expense under (1) "ordinary repairs" and (2) "restorative repairs." The one begins where the other leaves off. The "natural service life" of respective units is defined as the life that would be obtained with ordinary repairs, but without the benefit of "restorative repairs." However, when restorative repairs are made, provision is made in the accounting for distributing the cost between operating expense and the depreciation reserve, which is intended to give effect to the "aggregate service value of the units of natural service life restored by the work."

Where Is Line to Be Drawn?

This is a beautiful theory, and I am not directing any criticism against the principle embodied in this theory, but only against the practical difficulties of carrying it out. Where is the line to be drawn between what constitutes "ordinary repairs" and "restorative repairs?" It is true that the author has given certain definitions, but these definitions, interpreted by different people in their actual application, are bound to produce different results. The limitations of "ordinary repairs" are not clearly defined. In a given case, how great an expenditure would be required before we would pass from the boundary of "ordinary repairs" into the domain of "restorative repairs?" Is this to be measured by a dollar expenditure or a percentage of the total cost new, and, if so, would the same percentage be applicable in maintaining different property of different character? How would this plan work out on two different railroads where the policy of maintenance in one case was to make piece-meal repairs, all of which would probably be considered as "ordinary repairs," while in the other case the practice

is to postpone repairs as much as possible until they can be combined, and made at one time?

What relation is there between the expenditure made and the "service value" restored? It is conceivable that a comparatively small expenditure in one case would restore the same number of service units or service value as a much larger expenditure in another case. Shall the estimate of the actual service value restored be based on the amount of money spent or "by the exercise of judgment of those capable of perceiving the facts?" It is practically impossible to fix correctly and to account accurately for the units of natural service life that are in a given piece of property. Any estimate of this kind will have a wide range of variation, according to the judgment of the person making it.

It is proposed, however, for the purpose of recording the "ebb and flow" of service value, to set up two opposing accounts, one styled "service value consumed" and the other "service value restored," constantly contending one against the other. The varying status of these two accounts, the author claims, will "disclose the degree of adequacy of current maintenance"; and he claims further—"when the contra debits and credits are carried to the depreciation reserve account, the credit balance standing in the reserve will correctly indicate the extent to which the investment has been impaired." This method, depending as it does upon the "exercise of judgment of those capable of perceiving the facts," provides plenty of opportunity for the accounts to be distorted, due to errors of judgment or different interpretations in carrying out provisions of the plan. These variations entering into the accounting would defeat the purpose of the proposed system.

Expensive Procedure Required

In order to provide for the proper carrying out of this plan pertaining to the feature of "restorative repairs," it would be necessary to create an additional organization to handle it properly. As indicated before, it will be necessary to distinguish, in each case, between what constitutes "ordinary repairs" and "extraordinary repairs." Elaborate accounting records must be provided for. The present organizations of the carriers are not equipped to do this. An additional force would be required, and an idea of its extent can be obtained by considering just what would have to be done to apply this plan to the maintenance of equipment. Thousands of cars and locomotives come to the main shops each year for all kinds of repairs. In order to carry out this system, it would be necessary to have an additional force of experienced employees assigned to the task of inspecting, classifying and recording the repairs and expenditures for individual units of equipment. The present accounting rules do not require cost of repairs to be recorded separately for individual units. Work involved in carrying out the provisions of this plan would, without doubt, require such a considerable increase in force that, in most cases, at large shops, an additional office building would have to be provided to take care of the increased work. The records, computations and reports in connection therewith would be voluminous.

All this would be for the purpose of improving the accounting records, which, according to the author, would make it possible, by means of the net amount in the depreciation reserve account, to indicate correctly at any time, the extent of deferred maintenance or the extent to which the investment has been impaired. Theoretically, it might do this, but practically, there is considerable question whether it would be safe to base any conclusion solely on such an accounting record. The degree

of adequacy of current maintenance is disclosed in other ways. If there is any deficit, it will soon be apparent by positive indications. For instance, in the case of equipment, deferred maintenance is soon manifested by the increased number of bad-order units on hand, increase in delays in operation due to failures, and a general decrease in efficiency. The records of operation will disclose this condition quick enough, and that is the record that the experienced railroad officer would place the most dependence on.

Obsolescence and Inadequacy

The author states that "Losses of service value due to obsolescence and inadequacy are not accruable. They should be accounted for as and when they occur." He believes, apparently, that depreciation losses due to obsolescence and inadequacy should only be accounted for on the date of retirement of the property, and not charged currently to operating expenses during the life of the property. There is considerable doubt as to whether or not this theory is correct.

Is it not a fact that obsolescence, as well as inadequacy, are conditions which generally accrue gradually? Both of these conditions (obsolescence and inadequacy), if present, are usually brought about as a result of gradual growth. While there are exceptions, the experience of the past shows that improvements in design have not occurred suddenly, but gradually, step by step; also, the growth in demand, effecting inadequacy, is generally of a gradual nature. A unit may be partially obsolete or partially inadequate, as well as partially worn out, and still be retained in service. It is only retired when the conditions of obsolescence and inadequacy have progressed to such an extent that replacement is compelled by economic reasons.

Factors in Retirements

These two factors are probably the predominating cause of nearly all retirements. The retirement, when it takes place, is usually the result of a combination of a series of improvements, or growth, or change in character of the business; it may be due to one or all of these causes. This being the case, it would seem that the expense of depreciation due to both obsolescence and inadequacy, where it exists, should be recorded currently during the life of the property, if that is the period during which it occurs. If properly measured, it is certainly one of the current expenses incurred during operation, and should be recorded as such.

* * * *



East Tennessee & Western North Carolina (Narrow Gage)
Station at Johnson City, Tenn.

Looking Backward

Fifty Years Ago

The Pennsylvania estimates its loss in the Pittsburgh strike and riots of July at two million dollars. The shops at Altoona are just finishing an order for 68 engine cabs to make good the number destroyed in the strike.—*Railway Age*, December 20, 1877.

A bill authorizing the construction of the Sonora [now a part of the Southern Pacific of Mexico] is before the Mexican congress. It is said that nothing is lacking to assure the early construction of the line between Guaymas, on the Gulf of California, and a point in Arizona, there to connect with the Southern Pacific and the Texas & Pacific, except the recognition of the Diaz government by Washington.—*Railway Age*, December 20, 1877.

Probably at no time since the locomotive was invented could a railway be built and equipped as cheaply as now, and it is doubtful if present rates will be repeated after the inevitable advance comes. The construction of a railway in Pennsylvania was just let at the following figures: Earthwork, 12 cents per cu. yd.; loose rock, 25 cents; solid rock, 48 cents; culvert masonry, \$2.25; bridge masonry, \$4; arch culvert masonry, \$5.40. One section was let at 10 cents per cu. yd. for earthwork but was cancelled because the contractor was not considered responsible.—*Railway Age*, December 20, 1877.

Twenty-Five Years Ago

The presidents of the railroads in the Trunk Line Association, at a meeting on December 15, reaffirmed for 1903 the agreement made one year ago to exchange no passes. A clause was added to the agreement which provides that complimentary passes may be issued to executive, traffic and transportation officials of connecting lines.—*Railroad Gazette*, December 19, 1902.

The Kansas Supreme Court has decided that the Kansas City, Mexico & Orient can acquire by condemnation for a right-of-way land now owned by the Atchison, Topeka & Santa Fe at Emporia, Kansas. The court held that even though the Santa Fe land was occupied by abandoned side tracks, such occupation did not constitute actual use for railroad purposes.—*Railway Age*, December 19, 1902.

Ten Years Ago

In Washington it has come to be regarded as a foregone conclusion that the President will take over and operate the railroads for the duration of the war. Railroad executives from all sections of the country are in Washington conferring with the Railroads' War Board on the expected developments.—*Railway Age Gazette*, December 14, 1917.

The central passenger station of the Canadian Government Railways at Halifax, N. S., was wrecked by the explosion of a shipload of munitions in the harbor on December 6. About 400 freight cars were destroyed within an area $2\frac{1}{2}$ miles from the ship and of 70 trainmen making their headquarters at Richmond station only 10 reported for duty on December 10.—*Railway Age Gazette*, December 14, 1917.

The American railroad engineers who took over the French strategic railroad during September received their first locomotive from the United States recently. The welcome constituted a sort of personal victory for the locomotive and one engineer said that to him the greatest thing of all was the bell. French locomotives do not use bells. The Belgian government on December 8 turned over to the American expeditionary force 600 locomotives, all that remains of the Belgian motive power.—*Railway Age Gazette*, December 14, 1917.

Communications and Books

Cost Accounting

Philadelphia, Pa.

TO THE EDITOR:

Anent Mr. Sangster's views and your editorial comment thereon (in the *Railway Age* of December 10) in reference to the term "cost accounting," as applied to railroads. A confusion exists here as it always seems to in the past, because of neglect in realizing the type of expert to whom the problem should be given for solution. What both you and he are driving at in actual results is proper cost analysis first. This is the major part of the problem, the planning for which can only be entrusted to those combining both an engineering and statistical experience and training—the second or minor part is the accounting or mere bookkeeping, therefore performed by the accountant or clerk under the complete direction and supervision of the first.

As a simple illustration of this fact, to show the accountant's total lack of fitness for the handling of the subject—can anyone really expect him to know, in view of his experience and training—whether money expended is worth his clerical entries or vice versa, or the application of principles and methods of economics and statistics, involving in many instances higher mathematics for a correct solution? The first fact, although ignored for a long time in this field, is even more important than the second, because only from a master editing of basic data, can accurate results be drawn.

WILLIAM E. OBERLE,
Engineer Analyst.

Flexibility of Coupler Movement

NEW YORK.

TO THE EDITOR:

In the November 12 issue of *Railway Age* you published a letter from Charles Raitt, setting forth his reasons for freight car derailments on curves.

Mr. Raitt's statement that restricted lateral movement of couplers is frequently responsible for derailments should be emphasized, more especially in connection with cars having too much overhang from the center plate to the end sill and the consequent leverage action of the truck wheel flanges against the rail. There are large numbers of freight cars on American railroads which are equipped with the A. R. A. standard Type D couplers, with 6-in. by 8-in. shanks in combination with various designs of combination and cast steel hooded yokes, which seriously restrict the lateral clearance and movement. The U. S. R. A. 1918 design of Type D coupler, with 6-in. by 8-in. shank and 6-in. by 5 $\frac{1}{4}$ -in. reduced area butt, and the U. S. R. A. hooded coupler yoke with 1 $\frac{1}{2}$ -in. by 6-in. horizontal key, is a typical example.

This combination is usually connected by a 6-in. by 1 $\frac{1}{2}$ -in. coupler-yoke-sill horizontal key which results in the key slots in the yoke pulling lugs splitting and breaking out at the front and rear ends in horizontal and vertical directions. The limited lateral clearance between the coupler butt and the yoke pocket is also responsible for the yoke pulling lugs splitting and breaking away from the yoke legs, owing to the three to one leverage between the contacting points of the coupler butt and shank and the rear and front ends of the yoke pulling lugs, respectively. Until adequate lateral movement between the coupler butt and yoke connections and for the coupler shank between the draft sills and at the striking casting is provided, in combination with a coupler automatic centering device, these parts should be carefully inspected when freight car derailments occur, regardless of track and other equipment conditions.

The action of the coupler-yoke-sill horizontal keys in the sill slots, when the draft gear becomes defective and there is a direct pulling or buffing contact between the keys and the sills, also has a tendency to bulge the sills. In some cases they have been known to split the sills in the direction of the line of thrust.

The horizontal key connecting the coupler butt, the yoke and the draft sills has been responsible for many undesirable conditions and results. In addition to the limited lateral clearance, there is a variety of individual, and combinations of, causes resulting in broken coupler yokes and butts and in lost, bent and broken keys, owing to the direct connection of the coupler to the sills which makes it possible to continue cars in service after the draft gears have ceased to function. This results in a concentration of the full buffering and pulling shocks on the car underframe and superstructure.

In the matter of vertical angling, all couplers tend to buckle in buff, for which reason a space of $\frac{3}{4}$ -in. above the center line of the draft is usually provided in the striking casting opening and in the relation of the center of gravity of the center sills to the center line of draft, to permit of and compensate for this buckling action. Therefore, unless provision is made for the vertical angling at the coupler-yoke connection, undue strains are imposed on the coupler butt, the yoke and the key. It is well known that, in addition to the lateral and vertical play of the coupler head, it also has a twisting or torsional movement, as when cars are moving from tangents to elevated curves and vice versa. The horizontal key, passing through the coupler butt, the yoke and the sills, makes no provision for this movement.

A properly designed coupler-yoke connection should provide, in a practical way, a flexible universal joint between the coupler butt and yoke, and an inspection of the existing conventional arrangement on freight cars which are in service, on the repair tracks, or held in bad order condition, and of the scrap piles, will give quite conclusive evidence of the condition to which Mr. Raitt refers.

JOHN E. MUHLEFELD.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian,
Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Accident Bulletin No. 95, Calendar Year 1926. Compiled by Bureau of Statistics, U. S. Interstate Commerce Commission. Statistics and comment on "collisions, derailments, and other accidents resulting in injury to persons, equipment, or roadbed, arising from the operation of steam railways in interstate commerce." 116 p. Pub. by U. S. Govt. Print. Off., Washington, D. C., 25 cents.

First Special African Railway Number, Railway Gazette, November 21, 1927. Contains illustrated accounts of the histories and operation of the South African Railways and Harbors, the island railways of Africa, and the Beira & Mashonaland, Shire Highlands, Central Africa, Trans-Zambesia, and Tanganyika railways, as well as those in Angola and Mozambique, together with biographical sketches of the officers. 180 p. Pub. by Railway Gazette, London, Eng., 2 shillings sixpence.

Freight Rates and Agriculture—A List of References. Compiled by Minna Gill. What has been written in several languages and a variety of forms concerning freight rates and agriculture. 36 p. Pub. by Library, Bureau of Agricultural Economics, Washington, D. C., Apply.

Periodical Articles

Counterbalance, by A. M. Somerville. A story of back shops, railroaders and locomotives in which one iron horse at least was far from fading. Saturday Evening Post, December 10, 1927, pp. 24-25, 130, 133, 136, 137.

International Legislation, by Frederick S. Dunn. The chronological list of international agreements, some of which have to do with railroads and other systems of communication, on pages 582-583, is of particular interest. Political Science Quarterly, December, 1927, pp. 571-588.

Odds and Ends of Railroading

W. H. Miner, Inc., has added a motion picture of the Baltimore & Ohio centennial to its library. The film includes pictures of the grandstand, all floats that passed in review and the exhibits of sections of track.

Students of ancient history should be advised that they may obtain first-hand information regarding one of Cleopatra's famous love affairs, at New Orleans, since Mark Anthony is division passenger agent of the Missouri Pacific there.

A railway ticket 11 ft. 6 in. long, said to be the longest ever sold in this country, was turned over to N. Chanin, a lecturer for a Jewish fraternal organization by the New York Central in New York on November 30. The ticket contains 71 coupons for stations on 27 railways in 28 states and cost \$545.08.

The name of Horace Greeley, famous editor of the New York Tribune in the last century, together with his paper, is preserved by a county and two railway stations in Western Kansas. The county is called Greeley, the county seat is Tribune, a station on the Missouri Pacific, and nearby is another station called Horace, also on the M. P.

Emerson Martin, electrician helper in the shops of the Chesapeake & Ohio at Russell, Ky., is probably the tallest railway employee in the country, and certainly the tallest railway electrician. This lanky Kentuckian measures 7 ft. 8 in. from top to toe, which should give him a marked advantage over other electricians when it comes to working on overhead wires.

Historians at Des Moines, Iowa, have discovered that the ground on which the Rock Island station now stands once changed hands in a trade for a \$2 clock. The property is now worth a quarter of a million dollars. In 1848, at the time the trade was made, the clock in question was the only one in town. Its owner was moving back East and rather than have Des Moines clockless, the trade was effected.

The little town of Ponderosa, Calif., "Ain't where it used to be." In fact, it is now 27 miles from its former site. All the dishes in the 100 homes of the town remain intact, father's bedroom slippers are still in their accustomed nook and the pet kitten continues to warm her heels behind the stove. For while dwellings, the schoolhouse and the post-office and other buildings were in the process of being moved to the new site atop flat railroad cars, community life followed its usual course without disturbance. Housewives went right on peeling potatoes and stirring the soup, while the little city crept along aboard freight cars. At least, that's the way the story goes.

Advertising of substances or devices to compete with coal, printed in 22 American magazines in one month, was paid for at the rate of \$3,600,000 a year. This is the substance of a statement made by A. T. Dice, president of the Reading in an address at Pottsville, Pa., on November 3. Mr. Dice examined all of the leading American periodicals for the month of October; and in 22 of the most important ones he found 67 full pages of advertising devoted to the subject named. He estimates that these 67 pages cost \$300,000. The circulation of these magazines numbered 26,000,000. And he is informed by an experienced advertising man that this advertising, if account were taken of all newspapers throughout the country, would be found to amount to an expenditure of more than \$18,000,000 a year. This was said by way of suggestion to producers of anthracite coal, that they ought to take more pains to advertise their product.

A Curio the B. & O. Fair Missed

A Florida newspaper, in reporting an event in the railroad world, takes an entirely new slant on the situation in the locomotive cab, according to the Boston & Maine Magazine:

"He told of the viewpoint of the engineer, how he sits in the cab of his engine with one hand on the throttle and the other glued on the track ahead."

Material Conservation on the Jersey Central

A car inspector at Mauch Chunk, Pa., on the Central of New Jersey recently noticed a brake shoe missing while inspecting a passenger train and asked his partner to give him one. His partner complied with the request but did not have to go to his supply for it. Instead he found the missing brake shoe caught by the keyhole on the hook at the end of a steam hose chain. If loose brake shoes generally would acquire the habit of biting at hooks like this, it might pay the railroads to put steam connections on freight equipment.

The Bard of Avon in the Public Timetable

Someone who was fond of Shakespeare's plays must have been in charge of the naming of the stations on the Kettle Valley out in British Columbia. On this railway, within a short distance are to be found the following stations: Romeo, Juliet, Lear, Iago, Portia and Othello. But the Kettle Valley is not the only railway having Shakesperian allusions. Romeo, Ill., is on the Atchison, Topeka, & Santa Fe and the Chicago & Alton, and is quite near Joliet. There is a station on the Union Pacific and the Northern Pacific called Jacques, Idaho, and there are 14 stations called Arden scattered about the country, where the melancholy philosopher of "As You Like It" may roam in forests. There are 10 stations called Hamlet, one of which, in North Carolina, is a division headquarters for the Seaboard Air Line. The St. Louis-San Francisco has Caesar, Tex., and Portia, Ark., Romeo and Lear, on its lines. There is also a Brutus, Mich., on the Michigan Central, and a Desdemona, Tex., on the Wichita Falls, Ranger & Northwestern. Macbeth and Macduff are both represented in Canada, one in Alberta on the Canadian Pacific, the other in Ontario on the Canadian National. Besides there are two stations named Shakespeare in honor of the bard himself, one in New Mexico on the Southern Pacific, the other in Ontario on the Canadian National.

"A Fool-Proof Country"

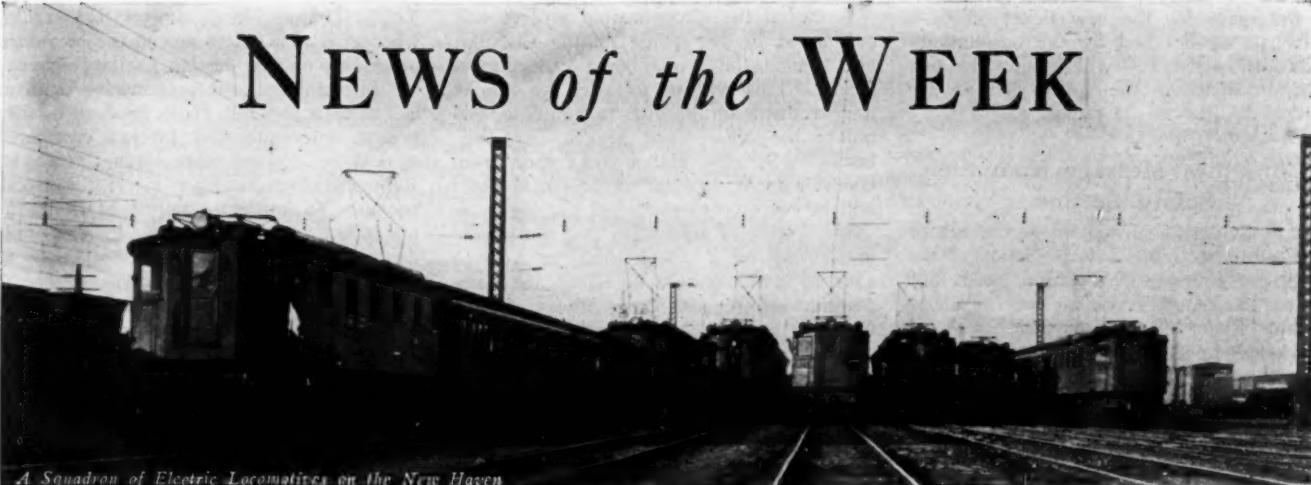
This is the conclusion concerning these United States by Clinton W. Gilbert, Washington correspondent of the New York Evening Post; and he offers as the main ground of his opinion the rapidly increasing internal friction of our railroad rate-regulating machinery. He says in part:

The Interstate Commerce Commission's investigation into grain freight rates promises to make a record; 16,000 pages of testimony already accumulated and, in addition, 1,000 exhibits; and the inquiry is only about half through. The record when completed will make about sixty large volumes. Reading it will be like reading the Encyclopedia Britannica through. Grain is produced pretty nearly everywhere and there are special conditions to be considered in special localities and on particular railroads.

When one considers vast accumulations of fact like this or the two inquiries into the Van Sweringen consolidation, one wonders about the practicality of railroad regulation. Everything has been submerged in a mass of printed records and opinions. . . . Easy and quick readjustment of rates is an essential element to any workable system. But you can't have it if one inquiry into one set of rates involves a record as long as the biggest encyclopedia. In a country less fortunate than the United States either the railroads or industry might starve while such mountains of facts are being accumulated.

Any body of men accumulating any such weight of printed matter inevitably staggers under its burden of material. The Interstate Commerce Commission is staggering under the load of volumes it produces. It is not a practical body. It is not primarily interested in results. It is at least as much interested in records. . . . This country has been so fortunate economically that none of the faults of its governmental system can hurt it. It has been a fool-proof country.

NEWS of the WEEK



PRESIDENT COOLIDGE has nominated G. W. W. Hanger as a member of the United States Board of Mediation for a new term of five years beginning January 1, 1928.

THE AMERICAN SOCIETY FOR TESTING MATERIALS has selected Atlantic City as the location for its next annual meeting, which will be held on June 25-29, 1928. The meetings will be held at the Chalfonte-Haddon Hotel.

THE INTERSTATE COMMERCE COMMISSION has granted a petition of the Reading for a further extension of time, to May 1, 1928, for the completion of its automatic train control installation under the commission's second order.

THE SENATE on December 13 passed the first deficiency appropriation bill, which had passed the House, including an appropriation of \$170,000 for the Interstate Commerce Commission to enable it to print accumulated volumes of valuation reports, amounting to 21,600 pages.

THE INTERSTATE COMMERCE COMMISSION has re-opened its standard time zone investigation for further hearing at Atlanta, Ga., on January 3 on the question of whether the orders of the commission prescribing standard eastern time for Atlanta should be modified so as to provide Central Standard Time for that city, as asked in a petition filed by the Atlanta Chamber of Commerce and other organizations of the city.

OF 868 FOREST FIRES in the state of New York, in the year 1927, as reported to the Department of Conservation, at Albany, 131 are charged against the railroads; and these are said to have included 20 per cent of the total acreage and four per cent of the total damage, which total was \$55,851. A statement issued by the Department says that railroad fires are being reduced by means of careful inspection of locomotives by the state inspectors, and the co-operation of the railroad companies.

WAGES OF CLERICAL EMPLOYEES on the Union Pacific Railroad have been increased, effective December 1, seven dollars a month, generally, for clerical positions, and three dollars a month for messengers, office boys, telephone operators and for clerks

of less than two years' service. The number of persons benefited is about 3,500 and the estimated annual addition to the payroll is \$280,000. Requests for similar increases are pending in the general managers' offices of the other roads in the Union Pacific System.

THE OKLAHOMA CORPORATION COMMISSION on December 5 refused to hear the application of the St. Louis-San Francisco requesting the commission to approve the removal of its shops from Sapulpa, Okla., to Tulsa. Although the shops were moved from Sapulpa to Tulsa early in 1927, at a cost estimated by Frisco attorneys to be \$150,000, the Corporation Commission has repeatedly refused to sanction the change. The commission rules that it will have no right to hear the railroad's application for location in Tulsa until the shops are moved back to Sapulpa.

THE ATLANTA DIVISION of the Louisville & Nashville, between Etowah, Tenn., and Atlanta, Ga., operating 305 miles of main track, and employing a total of 1,775 persons, reports that for the month of November, there were no personal injuries of sufficient importance to be reported to the Interstate Commerce Commission; and an equally good record was made in June, 1927. To celebrate these good results, the employees had a general celebration at which employees and their families, to the total number of 2,500, were in attendance. Superintendent M. Sargeant sent a congratulatory letter to every employee.

Presentation to Veteran Railway Club Secretary

At the meeting of the St. Louis Railway Club on December 9, the secretary of the club, Barney W. Frauenthal, general traffic agent of the St. Louis Public Service Company, was presented by the membership with a radio receiving set as a token of appreciation of his successful efforts in the upbuilding of the club. The presentation was made by George Hannauer, president of the Boston & Maine. The club has a membership of 1,000 and Mr. Frauenthal has been its secretary since 1906.

New Record for Daily Car Mileage

A new record in the average daily movement per freight car was established by the railroads in October, according to compilations by the Bureau of Railway Economics. The average was 34.7 miles per day, which was an increase of four-tenths of a mile above the best previous average, established in October last year. This also was an increase of 2.4 miles above the average for October, 1925.

There was also a new record for the first ten months this year, for which an average of 30.7 miles was attained. This was an increase of three-tenths of a mile above the average for the corresponding period last year.

The average load per car in October was 26.5 tons, a decrease of one ton under that for the same month last year but an increase of one-fifth of a ton above that of October, 1925. For the ten months' period this year, the average load per car was 27.2 tons, the same as that for the first ten months in 1926.

Enlarged Ticket Offices at Grand Central

Two hundred and fifty-two thousand dollars is the estimated cost of changes now being made at the Grand Central Terminal, New York City, to increase the number of ticket selling windows on the upper level from 28 to 49. The additional offices will open into the main waiting room.

This station was opened in 1913, and the number of passengers passing through it annually, which at that time was about 23,000,000 is estimated now to be about 43,000,000. In addition to these passengers, an estimated number of 10,000,000 persons annually visit the terminal for other reasons than the use of trains. The original 28 windows open on the grand concourse, facing north; at the end of the first seven years, the 28 were increased to 38; and now the further enlargement demands radical changes in the structure. At the back of the present ticket offices, that is, between the grand concourse and the main waiting room, are the two principal ramps leading down from the upper to the lower level. A considerable part

of the space for the new ticket offices—that part to be used by the accountants and other assistants—will occupy the unused air space in the upper part of the section devoted to the ramps.

Christmas Message from the Safety Section

L. G. Bentley, chairman of the Committee on Education of the Safety Section of the American Railway Association, sends out his regular monthly circular for December in the shape of a Christmas message, addressed to all railway employers and employees.

There is great reason, says the circular, to rejoice, at this season, for . . . "we are drawing nearer to our hearts' desire, a reduction of 35 per cent in railroad casualties by the end of 1930, as compared with 1923." Many railroads have already shown a reduction of 35 per cent. The average number of employees killed per month, this year so far, has been 121, showing a saving of 48 lives a month as compared with the year 1923. Other items from the accident record show similar encouraging results of the work of the safety committees.

The committee therefore, extends to each and every employer and employee, sincere appreciation for "wonderful support" during the past year.

W. E. Dunham Addresses Chicago Car Foremen

Efficient Car Repair Methods was the subject at the regular monthly meeting of the Car Foremen's Association, of Chicago, held at the Great Northern Hotel, December 12, the principal address being made by W. E. Dunham, superintendent of the car department of the Chicago & North Western. Mr. Dunham outlined effectively the principles which must govern both heavy and light car repair work in order to assure a maximum return for the money expended. The old way of hit or miss repair work is rapidly passing, and by scheduling the work and setting up a measuring stock of performance which is entirely practicable today, a marked improvement in the efficiency of car repair shop methods can be achieved. Following the paper, Mr. Dunham showed by means of a moving picture how a series of 1,000 box cars were constructed in 1926 at the Chicago shops of the Chicago & North Western, many labor-saving methods and devices being illustrated.

Reading Adopts \$20,000,000 Electrification Program

Agnew T. Dice, president of the Reading Company, in speaking before the Rotary Club at Philadelphia on December 14, outlined an improvement program for the railroad in the Philadelphia district involving an expenditure of \$31,000,000. Mr. Dice stated that \$20,000,000 would be spent for electrification and the balance on the elimination of grade crossings. Plans for the erection of an \$8,000,000 North Philadelphia station for New York express passenger service were announced previously and are not included in the \$31,000,000 program.

Work on the electrification project will be started in the spring on the Chestnut Hill branch, the branch being 10.8 miles in length. This will be followed by similar improvements on the lines to Lansdale, 24.4 miles; the New York branch to Langhorne, 23.9 miles, and a short spur from Glenside to Willow Grove. Several years will be required to carry out the program.

Mr. Dice also announced that plans were under way for a new terminal in Atlantic City in contemplation of which the company had purchased large tracts of land near its present station, which is to be abandoned.

Railway Bills in Congress

Practically all of the railway bills introduced in Congress so far have been old bills re-introduced. Many of this class were among the 1,400 or more bills introduced in the Senate on December 9 and following days, which include the following: Senator Pittman's bills, S. 656, to exempt certain classes of short lines from the recapture provisions of section 15a of the act to regulate commerce, S. 657, to amend paragraphs 3 and 4 of section 13, and S. 658, to amend paragraph 18 of section 1. Senator Robinson reintroduced as S. 668 the bill to abolish the Pullman surcharge and S. 669, relating to the use and construction of express and baggage cars. Senator Trammell reintroduced as S. 769 his bill to provide for regional appointments to the Interstate Commerce Commission and a similar bill by Senator Smith is S. 869. Senator Hawes reintroduced as S. 824 a bill to provide for seven regional commissions. Senator Fess's railway unification bill as S. 1175. Senator Gooding has repeated his long and short haul bill, S. 1263, and one to repeal section 15a, S. 1262. Senator Bratton has a bill, S. 724 to amend paragraphs 18, 19 and 20 of Section 400 and Senator Goff in S. 1161 proposes an amendment of the Elkins act. Senator Mayfield of Texas on December 12 introduced S. 1416 to repeal paragraphs 3 and 4 of section 13 and to repeal section 15a, and S. 1417 to amend paragraphs 18, 19 and 20 of section 1. Senator Simmons of South Carolina has a bill, S. 1526, to eliminate the requirements of certificates of public convenience and necessity in respect of construction of new lines of railroad and extensions.

Senator Mayfield on December 12 also introduced a concurrent resolution declaring it to be the policy of Congress that there shall be no acquisition of control or other unification of railroads unless the application shall make "reasonable provision in the plan for the possible incorporation of every short and weak line that may be in operation in the territory covered or to be covered by the proposed grouping or unification or unless by affirmative it is shown to be impossible to include such line upon reasonable terms, or unless the abandonment of operation of such line or its omission from the proposed plan is approved by the order of the Interstate Commerce Commission."

H. R. 5819, introduced by Representative Newton, was erroneously described in last week's issue as the National Industrial

Traffic League bill to amend section 15a, whereas it is a bill to amend the recapture provisions of that section similar to Senator Pittman's bill. Representative Graham has introduced a bill, H. R. 5563, to further protect interstate and foreign commerce against bribery and other corrupt practices. Representative Sanders, in H. R. 6680, proposes to amend section 1 of the commerce act expressly recognizing the jurisdiction and power of the several states to regulate intrastate commerce.

The House committee on interstate and foreign commerce at a meeting on December 14 decided to begin hearings on the Parker railway consolidation bill on December 19, with Commissioner Hall of the Interstate Commerce Commission as the first witness, and also to hold a hearing on January 17 on the Pittman-Newton short line bill. There was some discussion of the motor transportation bills, but it was decided to take no action until after the Interstate Commerce Commission issues its proposed report.

Western Arbitration Board Asked to Reconvene

A peculiar situation has arisen as the result of a statement issued in Denver on December 5 by the board of arbitration which has been considering the wage increase demands of the Brotherhood of Locomotive Firemen and Enginemen on the western railroads, signed by all six members of the board, and stating that a majority of the board had failed to reach an agreement.

Judge H. P. Burke, chief justice of the Colorado Supreme Court and chairman of the arbitration board, has requested the other members to meet in his chambers at Denver on December 16 to determine what, if anything, can be done in response to the repeated insistence of D. B. Robertson, president of the brotherhood, that the board be reconvened, and it is understood that the other neutral member, Paul A. Sinsheimer, and the two brotherhood representatives, S. A. Boone and Albert Phillips, expressed their willingness, but that the two railroad representatives on the board, R. V. Fletcher and J. W. Higgins, declined to do so on the ground that the board had disagreed and adjourned.

As a majority of the members of the board had indicated a willingness to award some increases, but failed to reach any common basis of agreement, the brotherhood has been trying to have the board reassemble and make further efforts to reach an agreement before December 20, the date by which it had been agreed a decision should be rendered.

President Robertson, immediately after the issuance of the statement, telegraphed the Board of Mediation at Washington asking that the board be reconvened in order to pass upon the question as to whether the statement "was intended as a decision of the questions submitted to arbitration and in order to continue its deliberations." This raised a question as to the right or power of the Board of Mediation to reconvene the arbitration board, as under the law it is authorized to do so only after an award has been made for the purpose of ascertaining its inter-

pretation of some feature of an award. The question was then raised as to whether the statement constituted an award. A brief was sent to the board by Donald Richberg, counsel for the brotherhood, taking the position that the authority of a board of arbitration continues until an award has been made or the time allotted to it has expired. It is understood that the brotherhood does not contend that the statement was an award and that the railroad conference committee takes the same position, but contends that it constituted a certificate of disagreement, the publication of which constituted notice to both parties, and ends the authority of the board. Under this construction the case could be reopened only by beginning the controversy all over again.

After a second request from Mr. Robertson the Board of Mediation expressed to Judge Burke the hope that the board of arbitration would reassemble for further consideration of the matter, without undertaking to pass on the legal questions involved, but rather tendering its good offices, while leaving the action of the board altogether to its discretion. Judge Burke then requested the members to meet again.

Electric Railway Competitive Construction Argued Before I. C. C.

The Interstate Commerce Commission's hearing room took on somewhat of the appearance of a political convention on December 9 and 10 when oral argument was heard by the commission on the application of the Piedmont & Northern for a certificate authorizing the construction of two extensions to close existing gaps in its system of electric lines, closely paralleling the Southern, from Spartanburg, S. C., to Gastonia, N. C., and from Charlotte to Winston-Salem, N. C. Examiner Davis, in a proposed report, had recommended that the commission deny the application, largely on the ground that the lines would represent an unwarranted duplication of facilities.

Arguments in support of the application were made by Charles E. Hughes, former Secretary of State, as counsel for the electric railway; W. G. McAdoo, former Secretary of the Treasury and Director General of Railroads, as counsel for the Georgia & Florida, which is building an extension to connect with the Piedmont & Northern and is interested in opening a new through route; by the governors of North and South Carolina, by a former member of Congress from South Carolina, J. F. Byrnes, and by L. M. Bailey, representing the North Carolina Commission; Mark W. Potter a former member of the commission, was present among counsel for the applicant, and two United States Senators were in the audience.

The application is opposed by the principal steam railways in the section, particularly by the Southern, and arguments against granting the application were presented by L. E. Jeffries, vice-president and general counsel of the Southern; C. J. Rixey and S. S. Alderman, also representing the Southern, and Thomas W. Davis, general solicitor of the Atlantic Coast Line.

John E. Benton, general solicitor of the National Association of Railroad and Utilities Commissioners, also appeared on the question of jurisdiction, taking the position that the electric line is of the class which Congress intended to exempt and that the question of state rights is involved.

Mr. Hughes said the application is unanimously supported by public authorities and by organizations representing the local communities who have asserted the need for additional transportation facilities and that the "wholesome competition" to be created would not hurt the Southern but would create development from which it would benefit. He said the intention of Congress was to prevent wasteful and harmful competition but not all competition. Mr. McAdoo treated the case as one in which the commission has the duty to protect a weak line such as the Georgia & Florida by enabling it to strengthen itself by a connection with a strong line such as the P. & N., which would make it part of a strong through route from Florida to a connection with the Norfolk & Western at Winston-Salem. He said the G. & F. is now bottled up by strong systems and that it is necessary that it have an independent outlet to the North.

Mr. Alderman said this case presents an extraordinary instance of paralleling an existing line and that the proposed extensions, instead of developing new territory, "stick along the back of the Southern like a mustard plaster." The existing roads completely serve the territory, he said, and the commission cannot find from the record that existing facilities are inadequate. One of the points made was that when the Piedmont & Northern built its line from Greenwood to Greenville, S. C., it took away half of the business of the Southern between those points. Mr. Davis said that the existing steam roads have made extensive investments in developing the section and that the commission should not allow an unneeded additional road to come in and take away their traffic. He said that local interests are always willing to have more railroads but that it was not the intention of Congress that such questions should be decided by popular vote. Mr. Jeffries argued that the case should be considered from the standpoint of national interest in the preservation of existing lines, saying that if the Southern's traffic is reduced it cannot give as good service.

Railway Engineers Asked to Advise on Flood Control

Representative Frank R. Reid, of Illinois, chairman of the House flood control committee, which has been holding hearings as to proposed flood control legislation, has invited committees representing the American Railway Engineering Association and the American Society of Civil Engineers to co-operate with the committee by furnishing data and recommendations.

President D. J. Brumley of the American Railway Engineering Association appointed a committee for this purpose consisting of L. A. Downs, president, Illinois Central; A. F. Blaess, chief engineer

Illinois Central; R. W. Barnes, chief engineer, Southern Pacific; H. Baldwin, chief engineer, Cleveland, Cincinnati, Chicago & St. Louis; C. R. Mee, chief engineer, Louisiana Railway & Navigation Company; J. R. Fordyce, consulting engineer; E. A. Hadley, chief engineer, Missouri Pacific; W. S. Hanley, chief engineer, St. Louis Southwestern; C. S. Kirkpatrick, chief engineer, Gulf Coast Lines; F. G. Jonah, assistant to president, St. Louis-San Francisco; C. A. Morse, chief engineer, Chicago, Rock Island & Pacific; E. F. Mitchell, chief engineer, Texas & Pacific; E. F. Salisbury, chief engineer, Louisiana & Arkansas, and B. A. Wood, chief engineer, Mobile & Ohio.

Messrs. Blaess, Hadley, Hanley, W. C. Swartout, senior assistant engineer, Missouri Pacific, R. H. Ford, assistant chief engineer, Chicago, Rock Island & Pacific, and C. R. Knowles, superintendent of water service, Illinois Central, spent several days in Washington during the week in preparing recommendations for the committee.

"As a Man Thinketh So Is He"

"As a man thinketh so is he," is the bit of Scriptural wisdom which is the keynote of Bulletin No. 55, which has been issued by L. G. Bentley, chairman of the committee on education, of the Safety Section, A. R. A., as a guide for the activities of safety officers of the railroads in the month of January.

"A man who does not *think safety* is a robber of human happiness. . . . It would aid the advancement of safety work as a whole if the administration of discipline were more frequently invoked for violation of safety instructions. Disciplinary penalties for infractions of safety rules are now assessed chiefly in cases where such infractions result in accidents. This has the effect of punishing the men concerned for the consequences of their faults rather than the faults themselves. . . . The officer in immediate charge of workmen stands to profit by having a safe organization. His men are his stock in trade; they can either make or wreck his administration. If he 'thinks safety,' and is able to get his men to adopt his thoughts as their own, he will surely have a safe administration.

" . . . Each accident is an indication that something is wrong. It lies with the man in charge to find out *what* is wrong and correct it if it can be done. Usually those involved in the accident and their associates *know what is wrong*, and they will come forward with this information if their contact with their superiors is built on fairness and mutual confidence. This confidence will never be found where the causes of accidents are misrepresented or the responsibility misplaced.

"Workmen should always approach their jobs, and each detail of their jobs, with the thought that safety of self and others, the success of their employers, depends upon the manner in which they perform those jobs. The spirit of our railroad men is so fine that if they have been properly taught, they will not wilfully rob any

man, woman or child of the right to happiness and well being.

"It is not too much to hope that by the end of 1928 every railroad will have made 35 per cent reduction in accidents over 1923; a great many have already done this, and have set up individual aspirations of 75 per cent reduction, which is most proper."

Supreme Court Settles "Safety First" Puzzle

A United States deputy marshal, assigned to guard a telegraph lineman employed by the Kansas City Southern from violence by strikers, went with the lineman to repair a telegraph line and while returning with him on a motor car over the railroad the car was derailed and the marshal injured. He sued the company. Verdict and judgment for the railroad was reversed, 12 Fed. (2nd) 4, for an instruction, which the Circuit Court of Appeals for the Fifth Circuit held erroneous, because under it the marshal could not have recovered if the jury found that he had voluntarily remained on the car after he saw it was being negligently run. That court said that the marshal's right to recover was not barred if his negligence was only a remote cause of his injury, and the lineman's negligence was the sole proximate cause of it.

The United States Supreme Court has affirmed the district court's judgment for the railroad and reversed that of the Circuit Court of Appeals. The Supreme Court holds that the case was not, as the Circuit Court of Appeals appears to have thought, governed by the doctrine of the last clear chance, which amounts to no more than this, that a negligent defendant will be held liable to a negligent plaintiff if the defendant, aware of the plaintiff's peril, or unaware of it only through carelessness, had in fact a later opportunity than the plaintiff to avert an accident. The doctrine is not applicable where plaintiff and defendant were engaged in a common venture which, acting together, they were carrying on in a reckless manner. In such a case their courses of conduct are not sufficiently independent to let it be said that either one or the other had in fact a later opportunity to avoid the consequences of their joint negligence. Here it was assumed by the Circuit Court of Appeals that the lineman was driving the car recklessly with the marshal's encouragement or acquiescence.

If the jury found negligence on the defendant's part, then their verdict turned on whether they thought the plaintiff guilty of contributory negligence, and the trial court's instructions on that question were considered sufficiently favorable to the plaintiff. Perhaps, the Supreme Court said, it would have been permissible to tell the jury that, though the marshal had at an earlier moment encouraged or acquiesced in the lineman's recklessness, he might still recover if later and before the accident he repented and asked the lineman to drive carefully. But the trial court's failure to do so was not ground for reversal.—*Kansas City Southern v. Ellzey*. Decided November 21, 1927. Opinion by Mr. Justice Stone.

Traffic

The Illinois Central has purchased a grain elevator at Omaha, Nebr., with a capacity of 350,000 bushels from the Crowell Elevator Company, Omaha.

The Transportation Club of Peoria will hold its annual dinner and meeting on January 17. W. L. Ross, president of the New York, Chicago & St. Louis will be the principal speaker.

The Chicago & North Western, in conjunction with the Union Pacific and the Southern Pacific, is including Death Valley, Cal., in a 22-day tour which these roads are operating this winter. Tours will leave Chicago on January 14 and February 11.

The Union Pacific has placed open-top observation cars on the Gold Coast Limited, between Yermo, Cal., and Los Angeles. The cars are of steel construction, 83 ft. long, and have seats for 92 passengers, each seat being provided with a glass windshield.

The Interstate Commerce Commission has assigned for oral argument before Division 1 on January 20 the railway mail pay case, No. 9200, in which the railways are seeking an increase in their rates of pay for the transportation of the United States mails, and the Post Office Department is seeking a reduction.

The Missouri-Kansas-Texas has established a new train, known as the Bluebonnet, between St. Louis, Mo., and Dallas, Tex., as a companion of the Texas Special. The new train leaves St. Louis at 2:05 p. m. and Kansas City at 5:30 p. m. and arrives in Dallas at 8:30 a. m. Returning, it leaves Dallas at 1:45 p. m. and arrives in St. Louis at 8:05 a. m.

Hearings in the lake cargo coal rate case, in which the railroads serving the Southern district coal fields are asking the Interstate Commerce Commission to allow them to make a reduction of 20 cents a ton in the freight rates on bituminous coal to the Lake Erie ports, were held on December 9, and 10, before Commissioners Campbell and McManamy at Washington. Hearings were held in Washington and in Minneapolis last month. Consumers of lake cargo coal in the Northwest are asking the commission to vacate its suspension of the reduced rates. George D. Brooks, general manager of the Chesapeake & Ohio, presented additional statistical evidence and there was some cross-examination of witnesses who had previously testified.

The Interstate Commerce Commission on December 13 made public its order in the southern cement rate case, prescribing a basis of rates for the future on cement in carloads, moving in interstate commerce from all points of production and seaports in the states of Alabama, Florida, Georgia, Kentucky, Louisiana east of the Mississippi river, Mississippi, North Carolina, South Carolina, Tennessee and Virginia, and from

all points of production in Illinois, including west-bank Mississippi river points, Indiana, Maryland, Ohio, and Pennsylvania to all destinations in Alabama, Florida, Georgia, Kentucky and Louisiana east of the Mississippi river, North Carolina, South Carolina, Tennessee and Virginia. The rates prescribed, in series of distance scales, are described as based on a scale higher than western cement scale II but somewhat lower in general than western cement scale III, subject to a minimum of 50,000 lbs., except when, for carriers' convenience, cars of less capacity are furnished. No finding was made as to intrastate rates in issue.

Freight Traffic in October

The volume of freight traffic handled by the Class I railroads in October amounted to 45,552,311,000 net ton-miles, a decrease of 2,743,750,000 net ton-miles or 5.7 per cent, under that of October, 1926, according to reports compiled by the Bureau of Railway Economics.

In the Eastern district there was a decrease of 11.6 per cent, while the Southern district reported a decrease of 6.7 per cent. The Western district reported an increase of 2.8 per cent.

For the first ten months in 1927 freight traffic amounted to 402,848,468,000 net ton-miles. This was a decrease of 2,377,318,000 net ton-miles, or six-tenths of one per cent below that of the corresponding period last year, but was 6.7 per cent above that of the corresponding total for 1925. Railroads in the Eastern district for the ten months reported a decrease of 1.4 per cent, while the Southern district reported a decrease of 2.4 per cent. The Western district reported an increase of 1.3 per cent.

S. E. Shippers' Board

The net volume of business of all industries in the Southeastern states during the months of January, February and March, 1928, will equal that of the first quarter of this year, according to estimates presented at the twentieth regular meeting of the Southeast Shippers' Advisory Board at New Orleans, La., on December 9. Among the commodities whose shipments are expected to increase are: aluminum three per cent, cement five per cent, fertilizer and fertilizer materials ten per cent, grain and grain products five per cent, iron and steel eight per cent, machinery six per cent, miscellaneous commodities ten per cent, and petroleum ten per cent. Those which are expected to remain unchanged in volume include brick and clay products, chemicals and explosives, crushed stone, gravel, furniture, southern pine, pulp, paper and products, sugar and textiles. Shipments of coal and coke are expected to be ten per cent less, cotton 25 per cent less, apples 30 per cent, strawberries ten per cent, hardwood four per cent, and cypress ten per cent.

Foreign Railways

New Rome-Naples Line

The direct Rome to Naples railroad line was opened to the public in Italy recently, reports Assistant Trade Commissioner D. F. Spencer, Rome, to the Department of Commerce. This line, connecting the capital with the large southern seaport, is about 134 miles long. Of this total length, about 21 miles are in tunnel.

The double track of the new line is said to facilitate movement of merchandise. The maximum grade is 3.25 per cent. There are two tunnels which are more than four miles long and two which are more than three miles long.

The advantage of the track Rome-to-Naples line is derived from the fact that it is 20½ miles shorter than the Cassino-Caserta line. The grades are easier and the curves are sufficiently gentle to enable a train to travel at great speed with safety. The line is completely new and independent of the other system. All grade crossings have been eliminated for the sake of speed and safety.

The following extra fares, called surtaxes, are to be collected, by way of experiment, from passengers traveling on express trains on the Rome-Naples Mergellina line: For first-class passengers, 25 lire, and for second-class passengers hav-

ing tickets at the full fare, 15 lire; for first-class passengers, 12 lire, and for second-class passengers having tickets at a reduced rate, 8 lire.

Refrigerator Service on German Railways

The German State Railways have recently added to the service, afforded by the refrigerator service on its railroads, by installing a fish train service from the ports of Hamburg, Cuxhaven and Kiel to a number of interior points at distances which vary from one to three days' travel. The refrigeration service of the German State Railways operates 2,258 cars, of which 625 are of fairly recent construction, according to Trade Commissioner J. T. Scott, whose report on the subject appears in the December 12 issue of *Commerce Reports*. The more recently constructed cars are about 26 ft. in length and have a capacity of from 12 to 15 tons. They have no bunkers or bulkheads, and their floor covering is of oak insulated by means of cork plates. When ice is used, it is artificial. The wood side walls are lined on both sides with cork and interspersed with an air vent. Commodities carried in this service are few beyond fresh meat, beer, fish and sometimes fruit.

THE BOSTON & ALBANY is inquiring for 400 tons of steel for a boiler house at Springfield, Mass.

THE BOSTON & MAINE has received bids on 270 tons of steel for a bridge at Livermore Falls, N. H.

THE BOSTON & MAINE has ordered 450 tons of steel for two bridges from the Bethlehem Steel Company.

THE PERE MARQUETTE is inquiring for 1,000 tons of structural steel for grade separation work at Detroit, Mich.

THE CHICAGO, MILWAUKEE & ST. PAUL is inquiring for 800 tons of structural steel for miscellaneous bridge repairs.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 17,000 tons of rail, from the Bethlehem Steel Company.

THE SOUTH MANCHURIAN RAILWAY is inquiring through New York export houses for about 16,000 tons of 100-lb. rail and accessories.

THE TEXAS & PACIFIC has ordered 1,000 tons of structural steel for a bridge at Melville, La., from the Missouri Bridge & Iron Company.

THE CHICAGO & ALTON has ordered 250 tons of structural steel for bridge work at Bloomington, Ill., from the American Bridge Company.

THE CHICAGO & EASTERN ILLINOIS has ordered 198 tons of structural steel for a freight house at Chicago from the McClellan-Marshall Company.

THE CHICAGO, BURLINGTON & QUINCY has ordered 1,500 tons of structural steel for miscellaneous bridge work from the American Bridge Company.

THE READING has ordered 400 tons of steel for a bridge over the Raritan river and Raritan canal at Bound Brook, N. J. The order was placed with the Bethlehem Steel Company.

THE BALTIMORE & OHIO has ordered 94,000 tons of 100-lb. and 130-lb. rail for delivery during the first half of next year, divided between the Bethlehem, Carnegie, Illinois and Inland Steel companies.

THE MISSOURI-PACIFIC has ordered 47,850 tons of rail, of which 10,000 tons are for the Texas Lines, from the Colorado Fuel & Iron Company, the Illinois Steel Company, the Inland Steel Company, the Tennessee Coal, Iron & Railroad Company, and the Bethlehem Steel Company. A total of 4,393,000 tie plates are included in the order. This company is also inquiring for 1,000 kegs of bolts, 10,000 kegs of spikes and a quantity of splice bars.

Machinery and Tools

THE SOUTHERN is inquiring for 2 steam shovels and 2 pile drivers.

THE CHICAGO, BURLINGTON & QUINCY is inquiring for one 20-in. drill.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for one 32-in. shaper.

Equipment and Supplies

Locomotives

THE MOBILE & OHIO is inquiring for eight 6-wheel switching locomotives and five Mikado type locomotives.

THE CLEMONS LOGGING COMPANY has ordered one 2-6-6-2 Mallet type locomotive, from the Baldwin Locomotive Works.

THE ALABAMA, TENNESSEE & NORTHERN has ordered 2 Decapod type locomotives from the Baldwin Locomotive Works. Inquiry for 3 locomotives was reported in the *Railway Age* of August 27.

Freight Cars

THE ANDES COPPER MINING COMPANY is inquiring for 20 cathode cars.

THE PACIFIC FRUIT EXPRESS is inquiring for from 300 to 600 under frames.

WILSON & Co., Chicago, are inquiring for 300 refrigerator cars of 40 tons' capacity.

THE LEHIGH & NEW ENGLAND is asking for prices on the repair of 200 steel gondola cars of 50 tons' capacity.

THE MOBILE & OHIO is inquiring for 250 36-ft. box cars of 40 tons' capacity,

250 double drop bottom steel frame gondola cars of 50 tons' capacity and 200 40-ft. 6-in., steel underframe flat cars, of 50 tons' capacity.

Passenger Cars

THE MOBILE & OHIO is inquiring for three 69-ft. steel passenger coaches, and three 69-ft. steel passenger coaches with partition.

THE DELAWARE & HUDSON has renewed its inquiry for 8 combination baggage and mail cars.

THE CHICAGO, BURLINGTON & QUINCY has ordered one gas-electric rail motor car from Mack Trucks Incorporated, in addition to the 25 previously ordered as reported in the *Railway Age* of December 3.

Iron and Steel

THE PENNSYLVANIA is inquiring for its first quarter requirements of spikes and bolts.

THE NEW YORK CENTRAL is inquiring for from 2,500,000 to 3,000,000 tie plates, 50,000 kegs of spikes and 10,000 kegs of bolts.

THE CHICAGO BURLINGTON & QUINCY is inquiring for a 136-in. heavy duty shaper.

THE NORFOLK & WESTERN has ordered a 8-in. by 10-ft. lathe from the Niles-Bement-Pond Company.

THE TEXAS & PACIFIC has ordered a 90-in. heavy driving wheel lathe from the Niles-Bement-Pond Company.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS has ordered a 36 in. by 18 ft. lathe from the Niles-Bement-Pond Company.

Signaling

THE LEHIGH VALLEY has ordered from the General Railway Signal Company 37 engine equipments for automatic train control, to be used between Easton, Pa., and Sayre.

THE INTERBOROUGH RAPID TRANSIT COMPANY, New York, has ordered from the Union Switch & Signal Company, an electro-pneumatic interlocking machine for Corona Yard, together with 21 color light signals and other material.

THE CHESAPEAKE & OHIO has ordered from the Union Switch & Signal Company, an electro-mechanical interlocking for installation at BA cabin, East Alleghany, Va.; also has ordered ten additional locomotive equipments for automatic train control to be used between Peru, Ind., and Chicago.

Car Retarders for Texas & Pacific

The Texas & Pacific has contracted with the General Railway Signal Company for the installation of an electric car retarder system at Tremble Yard, Fort Worth, Texas, both eastbound and westbound yards to be equipped. The system will include 31 switch machines, each with a color-light pot-signal indicating in both directions; 17 retarder mechanisms, 24 skates and three control machines; also complete equipment for a power house. The apparatus will include the latest designs such as those installed at Mechanicsville, N. Y., and Selkirk, N. Y.

* * * *



Rudolf Krentzer

On the Austrian Federal Railways

Supply Trade

The Eppinger & Russell Company has removed its main office from 165 Broadway to the Park-Murray building, 11 Park place, New York City.

The general offices and factory of the Railway Curtain Company are now located in the company's new building, 3352 West Grand avenue, Chicago.

George A. Price, secretary and treasurer of the American Arch Company, Inc., New York City, was elected executive vice-president on November 28. Prior to entering the employ of the American Arch Company, Inc., Mr. Price was in the motive power depart-



G. A. Price

ment of the New York Central. In March, 1918, he was elected assistant secretary of the American Arch Company, Inc., and subsequently became treasurer and assistant secretary in June 1920, and then secretary and treasurer in January, 1926.

The National Electric Light Association will remove its headquarters from 29 West Thirty-Ninth street, to 420 Lexington Avenue, New York City, on December 19.

W. Homer Hartz, treasurer of the Morden Frog & Crossing Works, Chicago, has also been elected vice-president and general manager of sales, succeeding Arthur C. Smith, deceased.

Brent A. Tozzer, New York sales manager of the Niles Tool Works Company and Pratt & Whitney Company, New York City, has resigned, to take effect December 31. Mr. Tozzer expects to announce his new plans about the first of the coming year.

The Rollway Bearing Company, Inc., Syracuse, N.Y., has opened a sales office in the Empire building, Pittsburgh, Pa. Samuel Farrell, who has been affiliated with the company for a number of years with headquarters at Youngstown, Ohio, is also in charge of the Pittsburgh office.

William A. Libkeman, who is sales representative and is directing the sales of the Forged Steel Wheel Division of the American Rolling Mill Company at Chicago, as reported in the *Railway Age* of December 3, also retains his connection as western sales agent of the Standard Steel Car Company.

H. W. Kilkenny, representative of the Ohio Brass Company, Mansfield, Ohio, for the past four years, with headquarters in the Pittsburgh district, has been transferred to the St. Louis district. S. W. Walworth succeeds Mr. Kilkenny in the Pittsburgh territory. Mr. Walworth previously served for three years with the Pittsburgh Transformer Company in a sales capacity in the Pittsburgh territory.

The Dearborn Chemical Company, Chicago, has opened a warehouse, plant and offices at 807 Mateo street, Los Angeles, Cal. The building, which is 57 ft. by 115 ft. and which contains 13,000 ft. of floor space, is of brick and concrete construction. The plant is equipped with several blending tanks for the compounding of oils for individual lubrication requirements, together with the machinery and equipment necessary for the manufacture and storage of other products manufactured by the company. Alex B. Burns is manager of the Pacific Coast territory.

The Copperweld Steel Company has moved its main office from Rankin, Pa., to Glassport. With the establishing of the headquarters of both the sales and engineering departments at Glassport, Robert J. Frank continues as vice-president in charge of sales; while Stanton Hertz, formerly electrical engineer, has been appointed sales manager and will be succeeded by Rolf Selquist, assistant electrical engineer. Wm. Jay McIlvane has been appointed district manager with headquarters at New York and Erich G. Elg has been appointed district manager with headquarters at Chicago.

Zeno C. Wilkinson, sales manager of the Youngstown Pressed Steel Company, Warren, Ohio, has resigned from that company to become vice-president and director of the Peter Smith Heater & Manufacturing Company, Detroit, Mich. Mr. Wilkinson has been in the steel business all of his business life, having been identified with the United States Steel Corporation at Gary, Ind., and the Bethlehem Steel Corporation before serving with the Youngstown Pressed Steel Company. In his new position he will be part owner of the company and have charge of both manufacturing and sales. Peter Smith Heater & Manufacturing Company is the new name of the Peter Smith Heater Company, which has been in business in Detroit for the past 45 years engaged in the manufacture of heating units for

steam railway and electric cars. The new company will have two departments, the pressed steel division and the heater division. A new unit shop will be constructed in the spring as an addition to the present plant at Detroit. E. J. Smith is president of the new organization, and M. J. Phelan is secretary.

Galena-Signal Oil Subsidiary in Receivership

On an application made at Houston, Tex., on December 8, by the Galena-Signal Oil Company of Franklin, Pa., Judge Monteith in the sixty-first district court appointed McDonald Meachum, of Houston, receiver of the Galena-Signal Oil Company of Texas, whose refinery and principal properties are in Houston but which has numerous assets of large value in other states and in foreign countries. The Houston company is a subsidiary of the Pennsylvania Company which owns all the capital stock of the defendant company. The Fidelity Trust Company, of Houston, is made a party to the suit because it is the trustee for the bondholders. M. J. A. Bertin, president of the Pennsylvania Company, made the following statement:

"This action has been rendered necessary by the depressed state of the oil business throughout the country which has reduced the value of crude stocks and the prices of gasoline and of other oil products and has slowed up collections to an extent which has made it impossible for refiners and distributors to operate except at a loss. This step is taken for the protection of the bondholders and other creditors of the defendant company and of the investment which the Galena-Signal Oil Company of Pennsylvania has in the Galena-Signal Oil Company of Texas by reason of stock ownership. The assets of the Galena-Signal Oil Company of Texas far exceed its liabilities in amount and its bonds are amply secured, but a reasonable time is required in which to collect in the credits due the company and to realize on its liquid assets. Although the Galena-Signal Oil Company of Pennsylvania, through ownership of capital stock of the Galena-Signal Oil Company of Texas, has a considerable investment in the latter company, the operations of the two companies have been along distinctly different lines and the receivership in no way affects the operating program of the Pennsylvania company which will continue as in the past along lines of specialization in the field of railway transportation and mechanical lubrication."

Obituary

Frederic A. Harper, auditor of the (Hegewisch) Chicago plant of the Pressed Steel Car Company, died on December 9 at his home in Chicago.

Charles W. Gray, secretary and treasurer and a director of the Graham Bolt & Nut Company, Pittsburgh, Pa., died on December 7. He had been affiliated with the Graham Bolt & Nut Company for more than 25 years and was formerly connected with the Pearson Manufacturing Company.

Benjamin Johnson, president of Benjamin Johnson & Son, Richmond, Ind., died in that city on December 5. He was born in Columbiana County, Ohio, on January 26, 1833, and entered the lumber business in 1858. Since 1873 he has been continuously engaged in the production and manufacture of cross ties and lumber.

Construction

BALTIMORE & OHIO.—This road expects to have a new line of railroad, from Hamilton Furnace on the Toledo Division to a connection with the Middletown branch near Woodsdale, Ohio, a distance of three miles, completed by March 1, 1928, the work to be done by company forces. Cost of the project will amount to approximately \$1,500,000.

CAMBRIA & INDIANA.—This company, through C. C. McChord, counsel, has applied to the Interstate Commerce Commission for a further extension of time of one year to December 30, 1928, in which to complete its extension in Cambria County, Pa., authorized by the commission February 11, 1925. The commission, in a letter to the company April 28, said that no further extension of time would be granted and that unless exercised by December 30, 1927, the right would lapse. The petition says that \$72,247 has already been expended on the work.

CANADIAN NATIONAL.—An order in Council approving the agreement between the Canadian National and the city of Vancouver, B. C., for the erection in that city of a large hotel was passed at a meeting of the federal Cabinet in Ottawa last week. The hotel will have about 400 rooms and will cost approximately \$4,000,000. Construction of this latest addition to the Canadian National's chain of hotels will commence near the close of next year when it is expected the big addition to the Chateau Laurier in Ottawa will be completed.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—This company plans the immediate construction of either a timber or reinforced concrete coaling station at Lafayette, Ind., to replace a structure destroyed by fire on November 12 with a loss estimated at \$25,000.

EUREKA NEVADA.—A contract has been awarded to the Truscon Steel Company, Youngstown, Ohio, for the construction of a steel engine house at Palisade, Nev., to replace a building destroyed by fire. The cost of the engine house, which will have outside dimensions of 50 ft. by 90 ft., and will include four concrete pits, is estimated at \$12,000.

MERIDIAN & BIGBEE RIVER.—Following the completion of construction of the first section of this line between Meridian, Miss., and Cromwell, Ala., 30 miles, on December 15, G. M. Neville, president, has announced that construction of the remaining 20 miles between Cromwell and Myrtlewood, Ala., will be undertaken early in 1928.

PENNSYLVANIA.—This road has let a contract for the erection of a one-story steel store building at Olean, N. Y., to the Austin Company, of Cleveland, Ohio.

PENNSYLVANIA.—This road, together with the officers of the city of Camden, N. J., is considering plans for improve-

ments at Camden which involve the elimination of about 15 grade crossings in that city. The cost of the improvements to be made are estimated at something more than \$1,000,000 which will be shared by the city and the railroad.

SACRAMENTO NORTHERN.—This company has applied to the Interstate Commerce Commission for authority to extend its line by the construction of 7 miles in Solano county, California, from a point near Armijo to a connection with the San Francisco-Sacramento Railway.

ST. LOUIS-SAN FRANCISCO.—Plans have been prepared for the construction of viaducts over the tracks of this railroad at Benton avenue and Grant avenues, Springfield, Mo. The Benton avenue structure will be 1,050 ft. long, with a 40-ft. roadway and will cost about \$200,000, of which amount the city has authorized an issue of \$75,000 of bonds to pay its share of the cost. The Grant avenue viaduct will have a similar length with a 36-ft. roadway and will involve a total expenditure of \$275,000, of which amount the city has authorized the issuance of \$90,000 of bonds.

UNION PACIFIC.—A contract for the construction of an employees' clubhouse at Caliente, Nev., at a cost of about \$90,000, has been awarded to the Rhyberg-Sorenson Company, Salt Lake City, Utah.

Hudson Bay Lines Completion Forecast in 1929

As a result of the change in the terminal port of the Hudson Bay Railway from Port Nelson to Fort Churchill the cost of constructing the road will be increased by over \$5,000,000, and the line will not be in operation until one year later, according to the annual report of Graham A. Bell, Deputy Minister of Railways and Canals at Ottawa.

"The surveyed line to Churchill," he says, "leaves the present Hudson Bay railway location at M. P. 356.8 and runs north from township 28, range 21, east of the principal meridian, to township 112, range 20. The last 28 miles parallel the Churchill river."

"The line to Churchill from M. P. 356.8 would be 154 miles long as against 67 miles to Nelson, and the cost to Churchill would be \$7,543,000 as compared with \$2,458,000 to Nelson."

"The foregoing estimates include half a million for railway terminals at either place. The engineers believe the line to Churchill could be completed in two working seasons, or by December, 1929, and the line to Nelson by December, 1928."

Immediately it was decided to change ports, Mr. Bell states, the government made haste to transfer equipment from Nelson to Churchill. Mr. Bell says: "As this is written, a force of nearly two hundred men is busy at Nelson reconditioning the floating plant there, dismantling buildings, and collecting material generally for immediate transfer to Churchill. Dredging

plant and equipment, fuel and other supplies, are also being sent into Churchill this fall by sea in order to make possible an early start in dredging and construction work in the spring of 1928."

As a result of the boom in mining operations in northwestern Manitoba and northeastern Saskatchewan, traversed by the Hudson Bay Railway already running, a large amount of local traffic for that road is promised in taking in supplies for the mines at Flin Flon and for the power development at White Mud Falls.

The Flin Flon Railway will be in condition to carry supplies by December 1, 1928, and will be completed in every way by September, 1929, according to Harry F. McLean, of Montreal, president of the Dominion Construction Company.

The C. P. R. and the Rutland

Reopening of the Canadian Pacific between Montreal and Boston, via Newport, Vt., and Wells River, was announced at the offices of that road in Montreal last week.

Up to that day the route was closed as the result of the floods for a period of 34 days, but this did not hold up the traffic to and from Boston, as trains were run on detours. The floods affected a rail distance of about 100 miles between Richford on the international border and Wells River. Establishment of communication was first effected between Richford and Newport, thence to Lyndonville, and finally to Wells River. Approximately 2,000 men have been working for the past five weeks uninterruptedly on the restoration of the line, and great difficulties were met and overcome. The result of the work is that the whole road has been practically rebuilt.

The Rutland, according to a statement made by an officer of the road at Rutland, has expended approximately \$600,000 for repairs of roadway necessitated by the November floods; and the loss of revenue because of suspension of train service is estimated at \$315,000. The total length of track washed away was 17.2 miles and, in addition to this damage, there were 40 landslides.



A Train of 114 Cars on the Jersey Central

Financial

ALGIERS, WINSLOW & WESTERN.—*Incorporation.*—This company has been incorporated in Indiana to construct a railroad between Algiers, Ind., and a connection with the Southern and the Cleveland, Cincinnati, Chicago & St. Louis southwest of Winslow in Pike county, about 15 miles. The railroad is planned by the incorporators largely as a coal-carrying line. Officers of the company are: Pierre F. Goodrich, president; R. W. Frost, vice-president; John B. Goodrich, secretary and treasurer. The stock consists of 5,000 shares of no par value. The question of the necessity of construction has been referred to the Indiana Public Service Commission by the Interstate Commerce Commission. Construction of the line has been opposed by the Evansville, Indianapolis & Terre Haute.

ATCHISON, TOPEKA & SANTA FE.—*Stock Issue.*—This company has applied to the Interstate Commerce Commission for authority to issue \$9,296,400 of common stock, to be subscribed for by stockholders of record January 27 in the ratio of one share to each 25 at par, the proceeds to be applied to the payment of bonds.

BELLEFONTE CENTRAL.—*This company has applied to the Interstate Commerce Commission for authority to purchase the Fairbrook branch of the Pennsylvania, from Tyrone to Fairbrook, Pa., which the Pennsylvania is seeking to abandon. The company states that with this purchase and the construction of 6 miles of additional track it would have a through line from Bellefonte to Tyrone, 46 miles.*

BULLFROG GOLDFIELD.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon its line extending from a connection with the Tonopah & Tidewater at Beatty, Nev., to Goldfield where a connection is made with the Tonopah & Goldfield, 78.95 miles. The Tonopah & Tidewater, the Bullfrog Goldfield and the Death Valley are under the same control and management. It was represented that the company's business, due to the decline of mining operations, has fallen off to a point where it is only operating a mixed train three times a week in each direction.

CENTRAL VERMONT.—*Receivership.*—George A. Gaston of New York and John W. Redmond of St. Albans, Vt., general counsel of the railroad, were appointed receivers of this property on December 12 by Judge Harlan B. Howe of the United States District Court. The application for receivership was entered by the Canadian National, which owns \$2,184,600 of the company's \$3,000,000 outstanding stock and which has advanced large amounts to meet the company's fixed charges. The reason given for the receivership was the losses in the recent floods. The new receivers announced that it was planned to issue receivers' certificates to supply funds to restore the company's lines.

The Central Vermont operates 493 miles of line. Its capitalization includes \$3,000,000 capital stock, and \$33,480,724 of long term debt. Included in the latter are \$12,838,300 refunding mortgage bonds, guaranteed by the Canadian National, about \$800,000 of equipment trust certificates, while most of the remainder represents indebtedness to the parent company. In 1926, the company earned only 82 per cent of its fixed charges.

Promptly following the appointment of the receivers the Canadian National announced its willingness to redeem at par and interest any of the guaranteed refunding mortgage bonds. The announcement also explained that the application for the receivership was made with the concurrence of the Central Vermont in order to enable the latter to obtain advances (and give security therefor) to provide the funds required to restore to working condition the lines which were severely damaged by the recent floods.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—*New Lease of Cincinnati Southern.*—This company has applied to the Interstate Commerce Commission for authority for a new lease of the Cincinnati Southern, owned by the city of Cincinnati, for 99 years from January 1, 1928, to take the place of the present lease expiring in 1966. The new lease provides for an increased rental, on a sliding scale of fixed and contingent rentals, and that the lessee shall double-track the line from Williamstown to Danville, Ky., at its own expense, at an estimated cost of \$13,200,000. The application says that to justify the continuation of the policy of additions and betterments which it has pursued for 25 years it must have assurance of possession of the railroad for a period longer than 39 additional years, as the improvements would revert to the city of Cincinnati on the expiration of the lease.

CINCINNATI NORTHERN.—*Extra Dividend.*—Directors have declared an extra dividend of 40 per cent, payable December 30 to stockholders of record December 23, in addition to the regular semi-annual dividend of 5 per cent, payable January 20 to stockholders of record January 13. Nearly all of the stock of this company is owned by the Cleveland, Cincinnati, Chicago & St. Louis.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$15,000,000 of 4½ per cent refunding and improvement mortgage bonds, to reimburse the treasury. It is expected to sell the bonds to J. P. Morgan & Co. at not less than 97½.

KANSAS, OKLAHOMA & GULF.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to purchase from the Missouri, Oklahoma & Gulf its line of 8.52 miles, from the Kansas-Oklahoma line to Military Junction, Kan.

MICHIGAN CENTRAL.—*Extra Dividend.*—Directors have declared an extra dividend of 50 per cent, payable December 30 to

stockholders of record December 30, in addition to the regular semi-annual dividend of 20 per cent, payable January 28 to stockholders of record December 30. Dividends paid in 1927 will total 87½ per cent, including a regular 17½ per cent semi-annual disbursement in January, a regular 20 per cent semi-annual payment in July and the 50 per cent extra. Over 99 per cent of the company's stock is owned by the New York Central.

MISSOURI, KANSAS & TEXAS.—*Dividend on Preferred Stock.*—Directors have declared a dividend of \$1 a share on the preferred stock payable December 31 to stockholders of record December 22. This issue has paid 6 per cent dividends since May, 1926. The declaration of the \$1 dividend at this time was made so that the quarterly dividend date might be adjusted to run hereafter from January 1, 1928, from which date dividends on the stock become cumulative.

NEW YORK, NEW HAVEN & HARTFORD.—*Stock.*—This company has applied to the Interstate Commerce Commission for authority to issue from time to time \$39,029,000 of capital stock in order that it may be in a position to meet its agreement to issue stock in conversion of its outstanding issue of \$39,029,000 of 6 per cent convertible debentures.

NORFOLK SOUTHERN.—*Bonds Approved.*—The Interstate Commerce Commission has approved an issue of \$1,966,000 first and refunding mortgage 50-year bonds and \$404,000 first lien equipment trust notes, to be pledged as security for a short term note of \$1,500,000. Upon being released from such pledge \$1,466,000 of the bonds may be sold at not less than 95½, giving an average annual cost to the carrier of 5.29 per cent.

PENNSYLVANIA TUNNEL & TERMINAL.—*Stock Issue Approved.*—The Interstate Commerce Commission has authorized this company to issue 250,000 shares of capital stock, par value \$100, to be delivered to the Pennsylvania in part payment for indebtedness.

PETALUMA & SANTA ROSA.—*Joint Control Proposed.*—The Southern Pacific and the Atchison, Topeka & Santa Fe have applied to the Interstate Commerce Commission for authority to acquire joint control of this company, a feeder to the Northwestern Pacific, by joint purchase of its capital stock.

PITTSBURGH, CINCINNATI, CHICAGO & ST. LOUIS.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue and deliver to the Pennsylvania \$8,530,000 of general mortgage 4½ per cent bonds, to be guaranteed by the Pennsylvania as lessee in settlement of indebtedness.

SOUTHERN.—*Increases Dividend.*—Directors have declared a quarterly dividend of \$2 per share on the common stock, payable February 1 to stockholders of record January 3. This has the effect of increasing to 8 per cent the annual dividend rate on this issue, as against the 7 per cent rate

which has been paid since February 1, 1926.

TORONTO, HAMILTON & BUFFALO.—*Extra Dividend.*—Directors have declared an extra dividend of 1 per cent, in addition to the regular semi-annual dividend of 3 per cent, both payable December 31 to stock of record December 27. This company is jointly owned by the New York Central, the Michigan Central and the Canadian Pacific.

WESTERN MARYLAND.—*Control of Greenbrier, Cheat & Elk.*—The Interstate Commerce Commission has approved the acquisition by the Western Maryland of the Greenbrier, Cheat & Elk, which has a line from Bergoo, W. Va., to Spruce, 35 miles, and the acquisition by the latter of the line of the West Virginia Pulp & Paper Company from Cheat Junction to Spruce, 39 miles. Acquisition by the Western Maryland will be by purchase of capital stock and by lease. The Greenbrier, Cheat & Elk has been authorized to issue \$1,585,000 first mortgage bonds and the Western Maryland to assume obligation and liability with respect thereto.

WHEELING & LAKE ERIE.—*Exceptions to Proposed Report in Directorship Case.*—Exceptions to the proposed report of C. V. Burnside, assistant director of the Bureau of Finance of the Interstate Commerce Commission, in which he recommended denial of applications filed by officers and directors of the Baltimore & Ohio, New York Central and Nickel Plate for authority to serve as directors of the Wheeling & Lake Erie, have been filed with the commission in behalf of Daniel Willard, president; George M. Shriner, vice-president, and Newton D. Baker, director of the Baltimore & Ohio. The statement of exceptions says there was no intent or purpose to seek to obtain an expression from the commission which might be construed as an approval of the "four-system" plan for the consolidation of the eastern roads, but that the four-system plan was referred to in order that the propriety of the present proposals with respect to the Wheeling & Lake Erie might have consideration in the light of the possibilities of that plan for the Eastern district.

"We submit," the B. & O. statement says, "that this proceeding does not present for the decision of the commission the propriety of the four-system plan, nor that it is necessary in this proceeding that such issue be presented. On the other hand, any possibility of misinterpretation in this respect of an order from the commission approving the application is within the control of the commission and your applicants do not ask that it should be otherwise. The record is bare of any testimony even suggesting the exercise of control, assuming control to exist. This is recognized by the proposed report itself. There would seem to be sufficient in the record to justify an assumption, at least for the time being, that ultimately the commission may approve a disposition of the Wheeling & Lake Erie in forming a limited number of systems in eastern territory as is proposed in the four-system plan. Even the report itself recognizes that the Wheeling & Lake

Erie bears a complementary and supplementary relationship to each of the trunk lines. And the difficulties inherent in the problem of consolidation suggest that it would be inexpedient at this time to require a 'retracement,' when to do so might have the effect of creating a new difficulty in the consummation of what is so far the only constructive suggestion toward the solution of the problem in the Eastern district which has been offered since the publication of the tentative plan."

Average Price of Stocks and of Bonds

	Last week	Last year
Average price of 20 representative railway stocks..	121.37	121.78
Average price of 20 representative railway bonds..	97.35	97.29

Dividends Declared

Albany & Susquehanna.—4½ per cent, payable January 1, 1928, to holders of record December 15.

American Express.—\$1.50, quarterly, payable January 3, 1928 to holders of record December 16.

Atchison, Topeka & Santa Fe.—Preferred, \$2.50, semi-annually, payable February 1, 1928, to holders of record December 30.

Beech Creek.—\$0.50, quarterly, payable January 3, 1928, to holders of record December 15.

Baltimore & Ohio.—Common, 1½ per cent, quarterly; preferred, 1 per cent, quarterly, both payable March 1, 1928, to holders of record, January 14.

Boston & Maine.—7 per cent prior preferred, 1¾ per cent, quarterly; first preferred A, 1½ per cent, quarterly; first preferred B, 2 per cent, quarterly; first preferred C, 1¾ per cent, quarterly, all payable January 2, 1928, to holders of record December 16.

Chicago, Burlington & Quincy.—5 per cent, semi-annually, payable December 27 to holders of record December 17.

Chicago, Indianapolis & Louisville.—Common, 2½ per cent; common, 1 per cent, extra; preferred, 2 per cent, all payable January 10, 1928, to holders of record December 24.

Chicago, North Shore & Milwaukee.—Preferred, 1½ per cent, quarterly; prior lien, 1¾ per cent, quarterly, both payable January 1, 1928, to holders of record December 15.

Cincinnati Northern.—40 per cent, extra, payable December 30 to holders of record December 23; 5 per cent, semi-annually, payable January 20, 1928, to holders of record December 13.

Detroit, Hillsdale & Southwestern.—2 per cent, payable January 5, 1928, to holders of record December 21.

Lehigh Valley.—Common, \$0.87½, quarterly; preferred, \$1.25, quarterly, both payable January 3, 1928, to holders of record December 17.

Michigan Central.—50 per cent, extra, payable December 30 to holders of record December 23; 20 per cent, semi-annually, payable January 28, 1928, to holders of record December 30.

Missouri-Kansas-Texas.—Preferred A, \$1.00, payable December 31 to holders of record December 22.

Morris & Essex.—\$2.12½, payable January 3, 1928, to holders of record December 9.

New York & Harlem.—Common and preferred, \$2.50, payable January 3, 1928, to holders of record December 15.

New York, Lackawanna & Western.—1¼ per cent, quarterly, payable January 3, 1928, to holders of record December 14.

Northern Pacific.—1¼ per cent, quarterly, payable February 1, 1928, to holders of record December 30.

Pittsburgh, McKeesport & Youghiogheny.—\$1.50, payable January 3, 1928, to holders of record December 15.

St. Louis, Rocky Mountain & Pacific.—Common, 1½ per cent, quarterly; preferred, 1½ per cent, quarterly, both payable December 30 to holders of record December 15.

Southern.—Common, 2 per cent, quarterly, payable February 1, 1928, to holders of record January 3. Preferred, 1½ per cent, quarterly, payable January 16, 1928, to holders of record December 27.

Toronto, Hamilton & Buffalo.—1 per cent, extra; 3 per cent, semi-annually; both payable December 31 to holders of record December 27.

Virginian.—Common, \$7.00, annually, payable December 31 to holders of record December 19.

Officers

Executive

R. F. Brown, secretary of the Gulf, Mobile & Northern, with headquarters at New York, has been elected vice-president and secretary, with headquarters at the same point.

Alfred R. Howard, vice-president, secretary and treasurer of the International-Great Northern, with headquarters at Palestine, Tex., will retire under the pension rules of the company on January 1 and will become connected with the San Jacinto Trust Company, Houston, Tex. Mr. Howard has completed 55 years in the service of the I.-G. N. and is now 75 years of age.

George H. Foster, who has been elected vice-president in charge of the operating department of the Lehigh Valley, with headquarters at New York, was born on March 5, 1876, at New York City. He was graduated from Harvard University in 1899, and from New York Law School in 1901. He entered railway service on January 1, 1904, and until April, 1918, served the Lehigh Valley as general land and tax agent. From April, 1918, until March 1, 1920, he was assistant to the federal manager of the same road, and on the latter date became assistant to vice-president. On April 7, 1926, Mr. Foster became acting vice-



G. H. Foster

president, which position he was holding at the time of his election as vice-president in charge of the operating department. A photograph and biographical sketch of the railroad career of **R. W. Barrett**, general counsel, who has been elected vice-president and general counsel as was announced in the *Railway Age* of December 10, appeared in the *Railway Age* of January 22, 1927, on page 319.

F. L. Blendinger, vice-president in charge of the operating department of the Lehigh Valley, with headquarters at New York, who has resigned on account of ill health, was born at Little

Valley, N. Y., and entered railway service in 1878 as messenger for the Erie. From 1880 until 1898, he was with this road consecutively as telegraph operator and in various clerical positions at Cleveland, O., and at New York. From 1898 until 1900, Mr. Blendinger served as chief clerk to the second vice-president in charge of operations of the same road, and from the latter date until January, 1902, was superintendent of telegraph of that road and the seventh district of the Western Union Telegraph Company.



F. L. Blendinger

From January until June, 1902, he was out of railroad service and at the latter time re-entered service with the Lehigh Valley. From 1907 until 1911, Mr. Blendinger served as purchasing agent and superintendent of telegraph, and was then appointed assistant to the vice-president in charge of operation, which position he held until May, 1916. At that time he was appointed vice-president in charge of operation, remaining in this position until June 10, 1918, when he was appointed federal manager for that road with jurisdiction over the Buffalo Creek and the Susquehanna & New York. On March 1, 1920, Mr. Blendinger again became vice-president in charge of operation of the Lehigh Valley, which position he was holding at the time he resigned. He served also for a time as general manager of the Buffalo Creek, which is leased by the Lehigh Valley and the Erie.

Financial, Legal and Accounting

Max Yates, acting auditor of the Mobile & Gulf, has been promoted to auditor, with headquarters at Brownville, Ala.

F. W. Stetekluh, assistant general auditor of the Northern Pacific, with headquarters at St. Paul, Minn., will on January 1, 1928, assume the title and duties of auditor of disbursements, succeeding **E. O. Parks**, who will retire under the pension rules after 46 years of continuous service with the company. Watch for duplication.

Robert I. Bodkin, freight claim agent of the Canadian Pacific, with headquar-

ters at Vancouver, B. C., has been promoted to assistant general claim agent, with headquarters at Winnipeg, Man., succeeding **D. C. Macdonald**, deceased. **A. Shelburne**, freight claim agent at Montreal, Que., has been transferred to Vancouver, succeeding **Mr. Bodkin**, while **F. K. Clarke**, freight claim agent at Calgary, Alta., has been transferred to Montreal to replace **Mr. Shelburne**.

Joseph Rosch, who has been appointed counsel for the Delaware & Hudson, with headquarters at Albany, N. Y., was born on December 9, 1879, at Wurtsboro, N. Y. He was educated in the public and high schools and attended the law department of the University of Buffalo. He was graduated from law school in 1900 and was admitted to the bar in 1901. Mr. Rosch practiced at Port Jervis, N. Y., and at Liberty, N. Y., until 1921, and was appointed to the Supreme Court of New York in January of that year. He resigned on December 1 of this year to become counsel for the Delaware & Hudson.

F. H. Millard, who has been appointed comptroller and assistant to the president of the St. Louis Southwestern, with headquarters at St. Louis, Mo., was born on July 17, 1888, at Central City, Nebraska. Mr. Millard obtained a civil engineering education at the University of Colorado and the University of Illinois and from 1910 to 1912 served



F. H. Millard

as a research fellow in engineering at the University of Illinois Experiment Station at Urbana, Ill. For the following year he was an instructor in engineering at the University of Illinois. From 1912 to 1914 Mr. Millard acted as a special investigator in the railroad department of the Railroad Commission of Wisconsin and in 1915 and 1916 he engaged in consulting work in railroad statistics. During 1917 and 1918 and again in 1920 he was assistant manager of the statistical bureau of the Western lines at Chicago, while in 1919 he served as assistant to the director of traffic of the United States Railroad Administration, at Washington, D. C. Mr. Millard entered the service of the Cotton Belt

on September 16, 1920, as assistant to the president in charge of valuation, with headquarters at St. Louis. His jurisdiction was extended to include the accounting department on January 14, 1922, occupying the position of assistant to the president until November 23 when he was promoted to comptroller and assistant to the president.

O. P. Barry, junior assistant comptroller of the Chicago, Milwaukee & St. Paul, with headquarters at Fullerton avenue, Chicago, has been appointed senior assistant comptroller, with headquarters at the Union station, Chicago, succeeding **J. H. Howard**, who has been appointed assistant chief traffic officer. **J. W. Severs**, auditor of expenditures, with headquarters at Chicago, has been appointed assistant comptroller, succeeding Mr. Barry. **E. P. Willey**, assistant auditor of expenditure, with headquarters at Chicago, has been appointed auditor of expenditure, succeeding Mr. Severs. **G. E. Engstrom** has been appointed assistant auditor of expenditure, with headquarters at Chicago.

William L. Maury, will retire on pension on January 1 as valuation accountant of the International-Great Northern with a record of 52 years of service with that railroad. Mr. Maury was born on November 30, 1851, at Washington, D. C., and attended the University of Virginia during 1871 and 1872. He entered railway service in 1872 as a rodman on the construction of the Selma, Marion & Memphis (now part of the Alabama Great Southern) at Okolna, Miss., and in the following year became an assistant engineer on the Paducah & Memphis (now a part of Illinois Central). In 1874 Mr. Maury served as a transition on a resurvey of the Mississippi & Tennessee (now part of the I. C.). For the next two years he acted as a clerk in the office of the auditor of the Atlantic & Pacific (now a part of the Atchison, Topeka & Santa Fe), becoming a clerk on the Missouri Pacific in 1876. Mr. Maury was later advanced to auditor of disbursements and in 1888 he was appointed auditor of the International-Great Northern, with headquarters at Palestine, Tex., a position he held for the next 26 years until his promotion to consulting auditor in 1914. During federal control of the railroads, he served as valuation accountant of the Southwestern region of the United States Railroad Administration and since 1920 he has been valuation accountant of the I.-G. N. Mr. Maury's entire railroad career has covered a period of 55 years.

Operating

C. P. Fisher has been appointed assistant freight trainmaster of the Long Island.

Antone Miller, assistant road foreman of engines on the Logansport division of the Pennsylvania, has been appointed assistant trainmaster on the same di-

vision, with headquarters at Logansport, Ind.

W. M. Shaw, assistant superintendent of the dining car service of the Reading, has been appointed superintendent of the dining car service, with headquarters at Philadelphia, Pa., succeeding **Samuel W. Derr**, who has retired.

T. T. Baldwin, Jr., supervisor of mail and express of the Boston & Albany, has been appointed trainmaster in charge of mail and express, passenger station service and passenger train service, with headquarters at Boston, Mass.

F. M. Christen, acting superintendent of dining and sleeping cars of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., has also been appointed acting superintendent of dining and sleeping cars of the Duluth, South Shore & Atlantic.

O. D. Blackwell, assistant trainmaster of the North Carolina division of the Seaboard Air Line, with headquarters at Hamlet, N. C., has been transferred in the same capacity to the Virginia division, with headquarters at Raleigh, N. C., and will be succeeded as assistant trainmaster at Hamlet by **S. W. Wheeler**.

C. N. Clark, superintendent of the Montour, with headquarters at Coraopolis, Pa., has resigned. Effective January 1, 1928, **W. E. Fowler**, chief engineer at Coraopolis, has been appointed general superintendent, with supervision over transportation and maintenance departments. **G. C. Harper** has been appointed superintendent of transportation, **James Nagel**, trainmaster, **John Miller**, general car foreman, **W. H. Hamilton**, superintendent of roadway and structures, and **W. C. Mawhinney**, superintendent of stores.

A. B. McNaughton, superintendent of the Portland division of the Canadian National, with headquarters at Richmond, Que., has been transferred in the same capacity to the St. Lawrence division, with headquarters at Montreal, Que., succeeding **J. J. Connally**, resigned. **J. E. LaPorte** has been appointed superintendent of the Portland division at Richmond, succeeding Mr. McNaughton. **J. S. McAdam**, assistant superintendent of the Massena, Rouses Point, Granby, Versailles, Freleighsburg, Hemmingford and Beauharnois subdivisions, with headquarters at Montreal, Que., has been transferred in the same capacity to the Cornwall subdivision, with the same headquarters, succeeding **O. Masse**, who has been transferred for promotion. **H. M. Gain**, assistant superintendent of the Sherbrooke and St. Hyacinthe subdivisions, with headquarters at Richmond, Que., has been transferred in the same capacity to Montreal, to succeed Mr. McAdam. **A. D. McCarthy** has been appointed assistant superintendent at Richmond, succeeding Mr. Gain.

Robert R. Cummins, who has been appointed superintendent of the Savan-

nah division of the Central of Georgia, with headquarters at Savannah, Ga., was born on September 30, 1884, at Marion, Ala., and was graduated from the University of Alabama in 1906. He served for a time as rodman, levelman and transitman on the Seaboard Air Line, and from July, 1907, until August, 1909, was transitman and resident engineer on the Georgia & Florida on surveys and construction from Vidalia, Ga., to Madison, Fla. On August 27, 1909, Mr. Cummins entered the service of the Central of Georgia as draftsman in the chief engineer's office. From January 1, 1912, until January 15, 1914, he served as assistant engineer, and then became pilot engineer, government valuation, which position he held until June 1, 1916. He then became super-



R. R. Cummins

visor of bridges and buildings of the Southwestern division, being transferred in this capacity to the Columbus division on January 20, 1917. He remained here until July 1, 1918, and was then appointed roadmaster of the Macon division, holding this position until August 16 of the following month, when he was commissioned first lieutenant in the engineers-overseas service. He was mustered out of service in July, 1919. On August 1, 1919, Mr. Cummins was appointed assistant trainmaster of the Columbus division of the Central of Georgia, and became roadmaster of the Southwestern division on February 1, 1920. On January 15, 1925, he was transferred in the same capacity to the Columbus division, which position he was holding at the time of his recent appointment as superintendent of the Savannah division.

Mechanical

Clarence H. Norton, master mechanic of the Susquehanna, Allegheny, Tioga and Bradford divisions of the Eastern district of the Erie, with headquarters at Hornell, N. Y., has been appointed shop superintendent, with the same headquarters, succeeding **Albert J. Davis**, resigned. Mr. Norton will be succeeded by **Charles J. Gerbes** as master mechanic at Hornell.

Engineering, Maintenance of Way and Signaling

E. W. G. Chapman has been appointed division engineer of the Edmundston division of the Canadian National, with headquarters at Edmundston, N. B., succeeding **T. L. Landers** who has been promoted to engineer of maintenance of way of the Atlantic region, with headquarters at Moncton, N. B. Mr. Landers replaces **F. O. Condon**, who has been promoted to principal assistant engineer of the Atlantic region, with headquarters at Moncton. **L. H. Robinson**, division engineer of the Halifax division, with headquarters at Halifax, N. S., has been promoted to assistant engineer of maintenance of way of the Atlantic region, with headquarters at Moncton. Mr. Robinson will be succeeded by **Alexander Scott**, division engineer of the Island division, with headquarters at Charlottetown, P. E. I. **F. S. Wilkins** has been appointed division engineer of the Island division to succeed Mr. Scott.

Purchases and Stores

Leon S. Myers has been appointed division storekeeper on the Northern Pacific, with headquarters at Tacoma, Wash., succeeding **Milton A. Cole**, who retired on December 1 after 40 years in the service of that company.

Obituary

William D. Neilson, president of the Elmira & Williamsport (part of the Pennsylvania), died suddenly on December 13 in Philadelphia, Pa. He was 77 years of age.

Gurdon A. Taft, general manager in the Southwestern department of the American Railway Express Company, with headquarters at Houston, Tex., died on December 5 in that city.

Herman A. Gausewitz, who retired as general superintendent of the Ft. Worth & Denver City and the Wichita Valley in 1920, died at Owatonna, Minn., on December 12 from an attack of apoplexy.

Thomas O. Wood, purchasing agent of the Gulf, Colorado & Santa Fe, with headquarters at Cleburne, Tex., died on December 10 at Temple, Tex., at the age of 77 years. Mr. Wood was taken suddenly ill at Oakdale, La., while on an inspection trip.

David J. Redding, who retired recently as superintendent of motive power of the Pittsburgh & Lake Erie, because of ill health, died on December 8 at his home in Dormont, Pa. A photograph and biographical sketch of the railroad career of Mr. Redding appeared in the *Railway Age* of October 1, 1927, on page 661.

Edwin G. Merriam, who retired as assistant to the vice-president and general solicitor of the Missouri Pacific in March, 1927, died at his home in St.

Louis, Mo., on December 7 at the age of 76 years. Mr. Merriam had suffered a paralytic stroke about a week previous to his death. A sketch of his railway career appeared on page 920 of the *Railway Age* of March 12 at the time of his retirement from active service.

J. H. Cragin, general storekeeper of the Los Angeles & Salt Lake, who died at Los Angeles, Cal., on November 28, was born on June 9, 1859, at Salmon Falls, N. H. He entered the service of the Union Pacific in November, 1887, as a clerk in the office of the agent at Ord, Neb. For the next five years Mr. Cragin worked in various departments of the U. P. and in 1892 he first entered the stores department as a helper at Grand Island, Neb. In 1893 he was promoted to storekeeper, with headquarters at Evanston, Wyo., where he remained until 1903 when he was transferred to Salt Lake City, Utah. Mr. Cragin was promoted to general storekeeper of the Los Angeles & Salt Lake, with headquarters at Los Angeles, in 1907, a position he held continuously until he died.

Don F. Milne, general superintendent of the Clover Leaf district of the New York, Chicago & St. Louis, who died at Frankfort, Ind., on December 2, was born in 1870 at Windsor, Ont. He entered railway service at the age of 12 years as a messenger boy and clerk on the Grand Trunk at Detroit, Mich. Five years later he was employed in a clerical capacity by the Toledo, St. Louis & Kansas City (now a part of the Nickel Plate), advancing through various minor positions until his promotion to superintendent of car service of the Toledo, St. Louis & Western, successor to the T. St. L. & K. C. in 1892. Mr. Milne was promoted to superintendent of transportation, with headquarters at Frankfort, in 1912, and on February 1, 1918, he was appointed superintendent at the same point. On December 1, 1923, he was appointed general superintendent of the Clover Leaf district of the Nickel Plate at Frankfort, a position he held continuously until the time of his death.

Henry M. Fickinger, former vice-president and general superintendent of the Fort Worth & Rio Grande and the St. Louis, San Francisco & Texas, who died at Boulder, Colo., on December 2 was born on November 18, 1848, at Kingsville, Ohio. He entered railway service in 1869 as a telegraph operator on the Cleveland & Erie (now a part of the New York Central) and in 1872 he was promoted to chief dispatcher, a position he occupied on the C. & E. until 1882. For the next 18 years Mr. Fickinger served successively as superintendent and general superintendent of the Sinaloa & Durango (now the Western Railway of Mexico), as general superintendent and general freight and passenger agent of the Split Log Road (now a part of the Kansas City Southern), as traveling passenger agent of the Kansas City, Ft. Scott & Memphis (now a part of the St. Louis-San Francisco) at Little Rock, Ark., and Ft. Worth, Tex., as north-

western passenger agent of the Frisco at Kansas City, Mo., and as commercial agent of the Colorado & Southern at Colorado Springs, Colo. In December, 1900, he was appointed superintendent of the Southern division of the Kansas City, Memphis & Birmingham (now a part of the Frisco), with headquarters at Memphis, Tenn., and in December, 1903, he became general superintendent of the Ft. Worth & Rio Grande and the Red River, Texas & Southern (merged with the former company), with headquarters at Ft. Worth. On April 4, 1904, Mr. Fickinger was elected vice-president and general superintendent of the St. L., S. F. & T. and the Ft. W. & R. G., a position he held until his retirement from active railroad service in March, 1906. Since that date Mr. Fickinger spent most of the time until his death at Boulder.

George Thomas Reid, vice-president and western counsel of the Northern Pacific, with headquarters at Seattle, Wash., who died on November 30, was born on April 2, 1871, at Etna Green, Ind. He graduated from the Warsaw (Ind.) High School in 1888 and moved to Tacoma, Wash., in 1889. While working as a clerk in the office of the Western Union Telegraph Company in Tacoma Judge Reid studied law and after his admission to the bar associated in the practice of law with James Wickersham who was later a representative in Congress from Alaska. Judge Reid entered railway service in January, 1906,



G. T. Reid

as attorney for the Spokane, Portland & Seattle in condemnation proceedings. He was a state senator from Pierce county, Wash., in 1905 and 1907 and served a year as deputy prosecutor in that county. In 1907 he was appointed to the superior court bench in Pierce county, resigning in 1908 to become division counsel of the Northern Pacific at Tacoma, where he remained until May, 1912, when he was promoted to assistant to the president and western counsel. On December 15, 1921, Judge Reid was elected vice-president and western counsel, a position he held until the time of his death. From 1912 to 1914 Judge Reid was also president of the North Yakima & Valley (now a part of the N. P.).

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Railroad Alertness on Air Transport Possibilities

PROOF of a most convincing sort has been given of railroad alertness on the subject of air transport development by the choice of this subject for discussion at the annual dinner of the New York Railroad Club last week. Several men well known in air transport were in attendance and the principal address was delivered by Harry F. Guggenheim, president of the Daniel Guggenheim Fund for the Promotion of Aeronautics. His address in abstract is published on another page of this issue and railroad men will find his presentation thoroughgoing and, we believe, suggestive. He discusses the future of air transport, in the light of the past, from the point of view of speed, safety and cost—and in all three points finds rapid progress being made. Mr. Guggenheim gives specific details regarding these improvements and closes his address with an appeal for co-ordination between air and rail transport. Students of railroad transportation, we feel, will find this address of great interest to them. Motor transport has already arrived as a competitor, and is now being co-ordinated with railroad service—but not with the ease with which such co-ordination might have been established ten years or so ago. It is, we repeat, highly significant of the alertness of railroad men to the possibilities of air transport and this subject was chosen for discussion at the greatest gathering of the year of the country's largest railroad club.

The 24-Hour System for Dispatching

IN Canada, as in Europe, the railways use the 24-hour system, for dispatching purposes. The public timetables are still issued on the a. m. and p. m. basis, while the employees' time cards and the train arrival boards at many of the stations use the other. Except for the difficulties which would occur during the transition period, there would seem to be no objection to making the change, and its advantages are obvious. To one accustomed to saying 10 p.m., the use of 22 o'clock instead may seem strange, but the experience of dispatchers who have gone from the United States to the Canadian railways proves that it is only a matter of a few days until one becomes accustomed to the change. There are many points in favor of the change, not the least of which is the greater clarity of the train sheets and the impossibility of any confusion arising due to mistaking a.m. for p.m., or vice versa, on train orders, bulletins, or any other documents dealing with train operation. A *Railway Age* representative had occasion recently to check train sheets, train orders, and dispatching methods in Canada, and, once the necessary mental adjustment was made, found it a far simpler task than it would have been in the United States.

Superintendents and Power

AMONG the many things which a superintendent must watch is his power. While the master mechanic should be charged with the responsibility of keeping the power in good shape, it is the superintendent who uses the locomotives and he should know at all times what service he may expect to receive from them. A mere scanning of the morning reports to check engine failures does not suffice, for this may not give a true picture of the situation. The locomotives may have run out practically all of their expected mileage and yet continue to be serviceable up to the shopping point. What the superintendent needs and should have is information which gives him, in relatively exact form, the condition of each of the locomotives on the division. This should not be in too highly technical form, but should be sufficiently detailed and comprehensive to give him at least a working knowledge. Various means have been adopted to enlighten the superintendents in this respect. The system employed on the Illinois Central, described elsewhere in this issue, is quite complete and thorough and works out satisfactorily. But, whatever the system used, it is important that the superintendent receive this knowledge in sufficiently comprehensive form, and without imposing too much of a burden on his time.

Gaining Public Recognition

WE have already mentioned in these columns our belief that the railroads have thus far not gained adequate public recognition for the noteworthy improvement they have made since the war in their passenger service. The greater speed and dependability of the freight service has been widely heralded. The railroads have not alone had to spread the story of their accomplishments in this field—their patrons and students of business have taken the task from them. And that is the test of success in solving a public relations problem. Equally spectacular improvements, however, in facilities and service for passengers have been made, but yet these so far have attracted scant public interest and comment. Perhaps railroad men themselves in their contacts with the public have been overmodest in speaking of their passenger service. Perhaps they themselves have been more engrossed with the serious problem of highway competition and declining revenues than they have with the more constructive side of the problem. At any rate the story has not yet been broadcast in any degree comparable with its merit. It is with pleasure, therefore, that at last we note a comprehensive and duly enthusiastic treatment of this railroad achievement in a magazine of general circulation. We refer to an article in the American Mercury for January, written by Charles Angoff, assistant to the editor of that publication. The article is in the main fair and calculated to arouse interest in and appreciation of modern railroad passenger service. The title "the Railroads at Bay" is a bit scary, as is a statement that the railroads are "fighting for life." The

facts presented will not for the most part be new to readers of the *Railway Age*, since this journal has been widely used as a source of information by the writer. On the other hand, securing recognition of the kind here accorded is of the greatest value to the railroads, and railroad men can well afford in their contacts with the public to emphasize such facts as it presents. Perhaps herein is a beginning of more adequate general recognition of an important achievement.

Are Railroad Bridges Ugly?

ARCHITECTS, artists and others with a well developed appreciation of the beautiful in the works of man are frequently given to criticism of the bridge engineer for his failure to produce structures which satisfy conventional standards of esthetics. The plate girder and the more common forms of truss which are so well suited to the forming of simple spans of moderate length are compared unfavorably with arches of stone, concrete or steel. The author of a recent work on bridge architecture brushes them aside as utterly unworthy of consideration in efforts to attain beauty in bridges.

Students of esthetics have contended that a structure can be said to possess beauty only when the reasons for its form or outline are obvious. This consideration is satisfied by the masonry arch because the arch offers the only means by which stone, a material having strength only in compression, may be utilized to form a span of any appreciable length. The same thought lies behind the natural attractiveness of the suspension bridge because here again the basic principle is readily understood; in fact, it is as simple as a wash line. But because the mechanics of a rigid frame are more involved than those of the arch or the catenary it does not follow that the girder or the truss are necessarily ugly. But even if this point be open to question the fact remains that without the truss and the girder modern railroads would be impossible, for it is only through their use that the bridge engineer is able to evolve designs that meet the extreme limitations which are so frequently imposed on him. Foremost among these is restricted head-room under bridges, one of the penalties which a railroad must pay for satisfactory track grades. Another is the demand for spans of great length imposed in the interests of waterway transportation. Again, in the case of grade separation, limitations as to both span and head-room impose restrictions that leave little choice to the designer. There is also the requirement of movable spans for waterway channel openings, which in the case of long spans has given rise to some of the ugliest of bridges, not because beauty was left out of consideration but because the only practicable design was necessarily of an ungainly appearance.

There is, of course, some foundation for criticisms of the designer of railway bridges. But this has been justified primarily in those cases where he has sought to achieve beauty by adorning his structure with ornamental details and his lack of training in that field has resulted in meaningless embellishments. In other cases he has failed to give heed to the importance of symmetry in the grouping of spans, although even here he may be the victim of circumstances since any other arrangement of span lengths might entail a great increase in cost. But his use of the materials at his disposal in the simplest way, which with steel, as with wood, implies the use of straight lines, cannot be classed as entirely ugly. It is in the employment of freak designs rather than in the tried and proven forms that criticism is justified.

A Banker On the Commission's Work

FEW persons are as well informed regarding both railroad conditions throughout the country and the work of the Interstate Commerce Commission as F. J. Lisman. Therefore, the article by Mr. Lisman, which is published elsewhere in this issue of the *Railway Age*, is well worth reading. Mr. Lisman is a veteran Wall street banker who is financially interested in numerous railways, including a number of short lines. He has closely followed the work of the Interstate Commerce Commission for years, and has an unusual special knowledge of it.

Speaking as a Wall street banker, Mr. Lisman plainly shows in his article that he believes the commission is doing much that is constructive; that neither the volume nor quality of its achievements is appraised highly enough in financial and railway quarters; and that in the same quarters the difficulties it encounters in dealing with the problems presented to it are not as fully recognized and frankly conceded as they should be. Railway officers and the public may be somewhat surprised to read what is virtually a defense of the commission from Wall street, since the commission is not usually assumed to be highly popular there.

Referring to the criticisms of the commission that have been voiced because of the failure of the railroads to earn "the standard return on their tentative value as permitted under the law," Mr. Lisman expresses the opinion that easily one-third of the reduction in rates since 1920 "has been brought about by voluntary action of the companies in their attempt to placate various shippers and thus get competitive business." This estimate seems too large, but that there is force in the point made by Mr. Lisman will hardly be denied by well informed railway officers. Competition between the railways themselves has not only caused reductions of rates but also prevented applications for advances which might have been secured. All initiative in rate-making has not been withdrawn from the carriers, and traffic executives in private conversations are often quite emphatic in criticizing one another because of their own failure to so cooperate in exercising their remaining power of initiative as to conserve or increase railway revenues to the greatest extent practicable.

Railway Attitude Toward Improvements

Regarding automatic train control Mr. Lisman says: "The carriers fought against this just about as hard as they fought against automatic couplers and nearly every other improvement," but that "Companies which resisted the order to equip some one division with automatic train control are hastening to install this safety device all over their main lines." It is true that, while the carriers did not at first accept automatic train control with enthusiasm, some of them are now making much more extensive installations than are required by the commission. It is, however, only fair to say that, although it has been on the commission's initiative, they have made the installations necessary fully to test and develop train control. Furthermore, Mr. Lisman's implication that the railways have "fought nearly every improvement" is not just. A large majority of the improvements in plants and operating methods that have made transportation service safer, better in other respects and more economical, have been initiated and carried out by progressive railway managements without the need or exertion of pressure from government sources.

It is true, as Mr. Lisman indicates, that in its efforts to readjust the freight rate structure of the country the commission has met with "selfish" opposition, but this has been offered by interested shippers as well as by interested carriers. Nor would it be fair to assume that all the opposition has been unreasonable or contrary to the public welfare. The rate structure built up under the influence of competition between both shippers and railways has been far from perfect, but the industry and commerce of the United States have grown as have those of no other country. The way freight rates have been made has promoted their growth, and it is by no means certain that if different principles of rate-making, involving especially more recognition of distance, had prevailed in the past the growth of industry and commerce would have been so great.

Differences Regarding Valuation

"In the hue and cry in connection with the differences of opinion about the principles of valuation," says Mr. Lisman, "the sheer magnitude of this tremendous and meticulously detailed job has been entirely overlooked." Elsewhere he says, "The extreme range is whether the carriers' properties are worth about 22 billions or about 35 billions. If the courts should unexpectedly take the carriers' claims at their full value the result would probably be that the commission would certify that 4½ per cent would be a fair rate of return under present conditions of the money market. * * * If the commission were to authorize a rate structure sufficient to yield a 5¾ per cent return on the maximum values claimed by the carriers, Congress would promptly legislate it out of office."

Whether Mr. Lisman meant to do so or not, he seems to imply, as many others assume, that the Supreme Court must choose between a valuation on the basis favored by the commission and one based entirely on present cost of reproduction. The *Railway Age* has never been able to understand why any such assumption should be made. The commission would virtually base the valuation on "prudent investment," less depreciation. The carriers contend, as the courts have held for many years, that weight should be given to cost of reproduction. The thing to be ascertained, the Supreme court has always held, is the "present value"; and obviously the "present value" is not necessarily either "prudent investment," less depreciation, or cost of reproduction, but may be more than the one and less than the other.

And why should it be anticipated, as Mr. Lisman does, that the percentage held to be a "fair return" will be reduced by the commission below 5¾ per cent if the carriers must be given a valuation recognizing the factor of cost of reproduction? They are lawfully entitled not only to a "fair valuation" but to a "fair return" on it, and it would be difficult to find any court decision holding that less than 5¾ per cent is a fair return. If the carriers should be given a fair valuation and less than a reasonable return on it, the return would be just as unfair as if based on an unfair valuation.

Criticising the Commission

The basis of valuation favored by the commission is regarded by all who look at the matter from the railway point of view as unsound, legally and economically. It is so regarded by many business men and economists. A majority of the commission having taken so extreme a position, from which four of its own members emphatically dissent, it was inevitable that it should be severely criticized. But such criticism does not neces-

sarily involve minimizing the magnitude of its labors or impugning the motives of its members, even though it may raise questions as to the extent to which they are influenced by social and economic philosophies inconsistent with the heretofore recognized law of the land and with the necessities of successful railway management under private ownership.

Mr. Lisman emphasizes the many huge tasks in the performance of which the commission is engaged. It is undoubtedly the most overburdened and hard-worked of all government bodies. For its members to deal adequately and constructively with all the great and intricate problems being presented to them seems humanly impossible. Its burdens ought to be reduced, and the best way to do this will be for Congress to desist from piling huge new tasks upon it until it has finished some of those on which it is now engaged. We must, however, frankly recognize that the commission is simply an administrative body dealing with highly controversial questions; that those questions are bound to be the subject of public discussion; and that its decisions will be and should be subjected to criticism by those who believe they are unsound in tendency and effect. Radical public men and newspapers have never shown any delicacy or reluctance in discussing the commission's regulations or the personnel of its membership; and those who want to see followed a policy of regulation conducive to the maintenance of private ownership and the success of private management would be foolish and cowardly if they did not squarely meet in the forum of public discussion, and, if necessary, in the courts, all the important issues raised.

Increase in Cost of Earning a Dollar

IN the year 1927, for the first time since the depression in 1921, the results of railway operation will include an increase for the roads as a whole in the operating expenses incurred in earning each dollar of revenues. In every year since 1921, when total earnings have increased, there has been a smaller increase in operating expenses; and in every year except 1927, when total earnings have declined, there has been greater reduction in operating expenses. In 1927 there will be recorded reductions of both earnings and expenses; but, for the first time, the reduction of expenses will be smaller than the reduction of earnings. This is the reason why 1927 will be the first year since 1921 for which there will be reported a reduction of net operating income for the roads as a whole. The reduction in net for the first ten months was about 96 million dollars, and for the year will be substantially large.

The Interstate Commerce Commission divides the railways of the country into eight regions. In the first 10 months of the year those in every region reported a decline of total earnings. In every region there was a decline in passenger earnings and in all but the Pocahontas and Northwestern regions there were declines in freight earnings. There were declines of operating expenses in four regions and increases in four.

In some important respects what has occurred in 1927 resembles what occurred in 1924, but there are important differences. In 1924 total earnings declined 368 million dollars, but operating expenses were reduced 387 million, and in consequence the operating cost of earning each dollar of revenues declined and there was a small in-

crease in net operating income. In the first 10 months of 1927 total earnings declined almost 140 million, while operating expenses declined only 44 million.

Why were the railways able in 1924 to reduce their operating expenses both absolutely and relatively more than the decline in their total earnings, while in 1927 they have failed to do so? The explanation is to be found mainly in two facts. They had to make large expenditures for maintenance of equipment in 1923 owing to the effects of the shop employee's strike and were able in 1924 to show large savings by curtailing this class of expenditures. The second important and pertinent fact is that advances in wages estimated at 60 million dollars annually have been in effect throughout 1927, and to this extent have nullified economies that otherwise would have been shown as a result of the increases in operating efficiency that have been secured in 1927 as in previous years.

The operating ratio of the Class I roads in 1920 was 94.32 per cent; 1921, 82.71; 1922, 79.1; 1923, 77.83; 1924, 76.13; 1925, 74.10; 1926, 73.15. In the first 10 months of 1926 it was 72.85, and in the first 10 months of 1927, 73.96. The small difference is significant because it shows that for the first time in seven years changes in total earnings and in unit costs of operation have had more effect on financial results than increased efficiency of operation.

Sugar Rates Revised

THE recent decision of the Interstate Commerce Commission prescribing an upward revision of sugar rates in the southeast, in which the Hoch-Smith resolution is cited as one reason for advancing the rates, would almost give the impression that the commission had found a way of partially off-setting the reductions it has heretofore ordered in certain rates on agricultural products affected by depression by discovering a commodity that can properly stand a greater share of the "transportation burden."

A closer analysis of the decision, however, indicates that it has little significance from that standpoint and that, although the report by Commissioner Eastman expresses the opinion that the rates prescribed will average a little higher than the carriers' proposed rates and that they will add somewhat to the carriers' aggregate revenues, the references to the Hoch-Smith resolution are given merely to emphasize other reasons for adopting the basis of rates which is prescribed. The case was not handled under the Hoch-Smith resolution; in fact the hearings were concluded before the resolution was passed, and the decision represents rather an effort to make the sugar rate adjustment fit Commissioner Eastman's new class rate revision scheme, prescribed as a result of the Southern Class Rate Investigation.

The general basis adopted is 27.5 per cent of the new first class rate scales, which are about to go into effect, and this seems to be a compromise between the 30 per cent basis used by the commission in its southwestern rate revision and the 26 and 28 per cent basis which it recently used in prescribing rates from New Orleans to Selma, Montgomery and Mobile, Ala. Two of the commissioners, Woodlock and Taylor, in a dissenting opinion favor a 30 per cent basis for sugar rates and Commissioner Eastman, in the majority report, says there is much which points to the conclusion that the new Class 8 rates, which are 30 per cent of first class, are not in excess of maximum reasonable rates on sugar. While he says that a "fair distribution of the transportation burden, such as is contemplated by the Hoch-

Smith resolution, may at times involve requiring shippers to pay on certain commodities rates materially higher than the carriers are willing to charge," he adds that before such requirement is made the shippers are at least entitled to more notice and opportunity for opposition than they have had in this proceeding. Commissioner McManamy, citing this last statement, takes the position that the majority have been too generous in making rates higher than were proposed by the carriers. However, the commission's order itself, in fixing a basis for reparation on past shipments, finds that rates have been "intrinsically unreasonable under any adjustment," only to the extent that they have exceeded the Class 8 rates.

Is Cost Accounting Practicable?

DISCUSSION of the applicability of cost accounting to transportation operations has thus far been chiefly characterized by its indirection. This has partly resulted from an apparent inability on the part of the Bureau of Accounts of the Interstate Commerce Commission to determine exactly what it desires to do in undertaking the revision of its 1914 classification of operating expenses. Revision has been under way for some five or six years, but the purpose for which it is desired is not yet clear. Various purposes or ideals have been talked over. One revision was said to be based on the desirability of revising the language with a view to including the multitude of interpretations that had been made. A second ideal was simplification to save accounting expenses. A third was to reframe the classification so that it would produce figures which would facilitate the exercise of supervision over the efficiency and economy of operation for which the commission was made responsible in the Transportation Act. A fourth complication was depreciation accounting, and the situation has now reached the point where the revision of the classifications is being considered secondarily to the depreciation order, which ordinarily might be regarded as a less important detail.

More recently still a further ideal has been presented, namely, to build a classification so constructed as to assist more adequately in the determination of the cost of performing individual services, by which is meant ascertainment of the cost of carrying individual classes of freight, or of performing individual operations in the shops and elsewhere. Consideration of the difficulty of deciding what duty the classifications should be made to perform has led most intelligent observers to the belief that the classifications ought to be let alone, and there is much doubt that any good can come from all the trouble that has been made.

At the other extreme are those who seem to want an entire revision of railway accounting methods, including those who advocate the last ideal mentioned above—cost accounting. It is suggested that because cost accounting has proved of great value in industry, it should prove of equally great value in transportation. Even those who prefer to see the classifications let alone will agree that here, at least, is one phase of the situation in which there is an issue that can be discussed with somewhat less indirection than has hitherto been the case. It is: Cost accounting having proved of value in the determination of the costs of producing commodities in manufacturing establishments, can it not be applied with equal facility in the determination of costs of carrying these—and thousands of other—commodities on a railroad? Cost accounting advocates will undoubtedly discover that to find the costs of producing manufactured articles is one thing, but that to determine the costs of the services of transportation and distribution is quite another.

Canadian Roads Open Impressive Union Station at Toronto

Structure started in 1913 effectively combines architectural beauty with a layout designed to give maximum utility

AFTER years of delay in construction, the Canadian National and the Canadian Pacific railways have opened their new union station at Toronto, Ont., which in all respects surpasses similar structures in Canada, and which may well be said to rival the largest and finest passenger stations in the United States. For an entire block, with a frontage of 850 ft., this new station, which is of classic architecture, presents its impressive face to the city of Toronto, an architectural array of cut and tooled Bedford limestone, boldly set out by a central colonnade of 22 massive limestone columns which for a distance of 250 ft. forms the main entrance portico.

The new station lies in a direct east and west direction, just south of the main business center of the city and only a few hundred feet east of the old station facilities which it replaces. The front of the building, which is 752 ft. long, faces northward on Front street between Bay and York streets, and has been designed architecturally to represent one large unified structure. In reality, however, the station is made up of three distinct units, the passenger station in the center section, seven stories high, supported on the east and west ends by

large four-story wings approximately 250 ft. long by 170 ft. wide.

The east wing is occupied exclusively by the Dominion post office department, while the west wing, above the first floor, is used exclusively for railroad offices. Directly behind the central portion of the building is the other main unit of the union station, the train concourse, which eventually will extend approximately 250 ft. beyond the station proper as a subway waiting room and passageway to 12 elevated station platform tracks.

Station Construction Was Started in 1914

The beginning of the Toronto union station project dates back to the fire of 1905 which wiped out a large area along the waterfront of Lake Ontario, deemed highly suitable for the site of a new passenger station. In 1906, the railroads submitted a proposal for a joint passenger station which was turned down by the Board of Railway Commissioners of Canada who brought into the project the idea of the complete separation of grades between the railroad tracks skirting the lake front and the many cross streets.

Thus was the beginning of a controversy between the



The Entrance to the Station Presents an Impressive Appearance

governmental authorities, city officials and the railroads, which extended over a number of years. In the main, up until 1912, the principal controversy was between grade separation by means of overhead street bridges, and track elevation, the latter method being insisted upon by the civic authorities. With this controversy settled at about this time in favor of track elevation, which was to entail millions of additional expense to the railroads, track elevation work in connection with a new station was started in 1913.

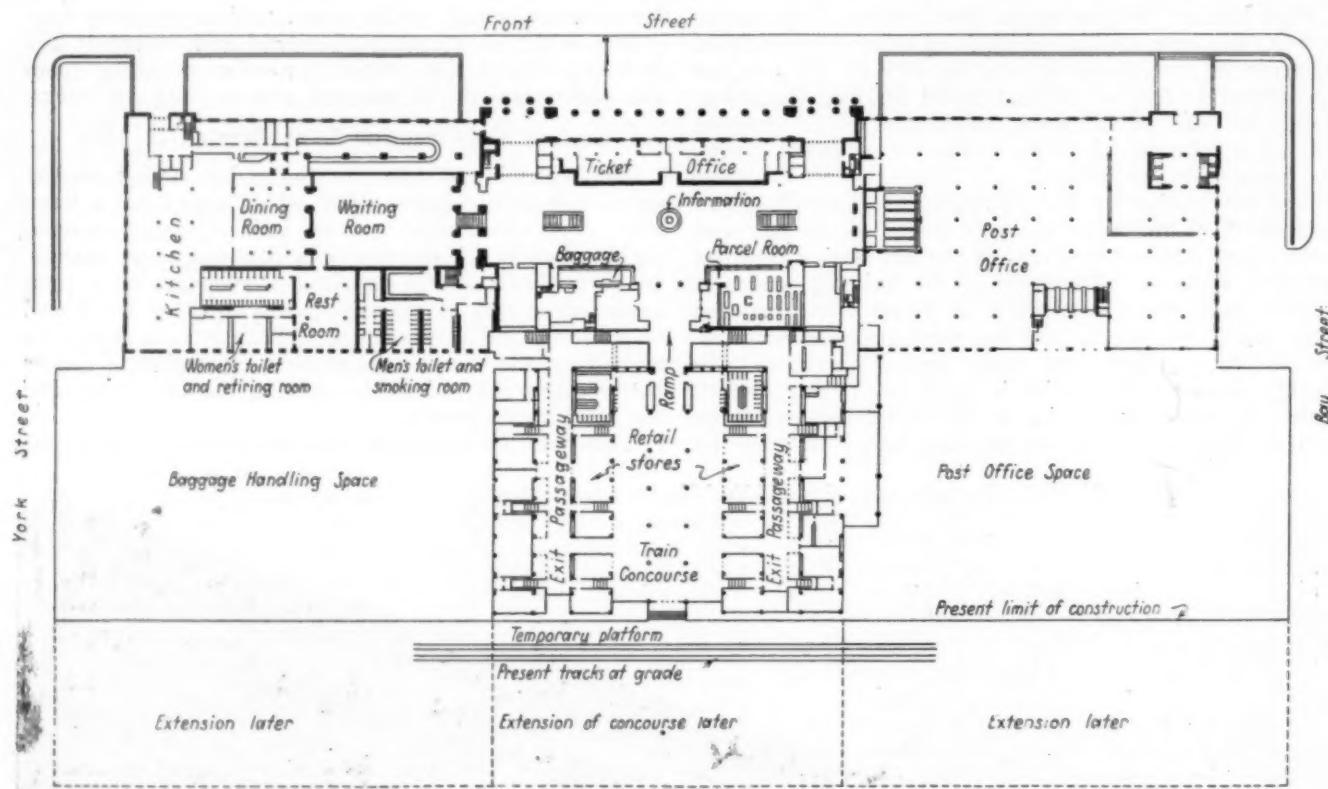
Acting under an agreement imposed upon the roads by the Dominion government, construction of the new station building itself was started in 1914, under the jurisdiction of the Toronto Terminals Railway Company, an organization which had been incorporated in 1906 to consolidate the interests of the railways in the union station and grade separation projects. Shortly after work on the station was begun, the war broke out

The new station relieves an old station building and train shed, located just west of York street and south of Front street, which was constructed by the Grand Trunk in 1872 and 1873. These old facilities served Toronto adequately until about 1890 when it was found necessary to erect a large office building, facing on Front street, to be used in connection with the original facilities completed in 1873. This unit was completed in 1896, and since that date the combined facilities have served the railroads entering Toronto as a union station, until the recent opening of the new station.

Toronto Has Large Passenger

and Baggage Business

The need for new and enlarged station facilities at Toronto has long been felt. As early as 1913, when the present new station was first definitely contemplated, the old facilities were handling an average of 130



Plan of Station Main Floor and Concourse

In Europe and construction was stopped abruptly. In August of the following year, however, work was resumed on the station, but hampered by war conditions and difficulties in financing, the exterior of the station was not completed until 1918. Owing to further difficulties the station was not used in any way until 1920 when the post office department occupied the east wing, and the various railroad departments occupied the offices in the west wing. So utilized, the new station at Toronto was not completed or used as a passenger terminal until August of this year. In fact, the station as a whole is not completed yet, and is being operated under temporary track conditions at the present time. Final plans for the completion of the work have been definitely decided upon, however, and no unusual delay is anticipated in carrying them out. These plans involve the final elevated track layout at the station, together with the construction of platforms and train sheds, and the completion of the subway train concourse.

through trains daily, and during certain seasons of the year were accommodating as many as 75,000 passengers in 24 hours. This was in addition to a baggage movement of about 10,000 pieces a day, a traffic somewhat heavier than that handled at any of the larger passenger stations in New York City.

Since 1913, every phase of Toronto's station problem has increased in large proportions, until at the present time the new station is handling an average of 180 trains and from 60,000 to 75,000 passengers each normal day throughout the year. During the Canadian National exhibition, which takes place at Toronto in the early fall each year, approximately 200 trains in many sections enter the station, and the normal passenger traffic is increased to approximately 100,000 passengers each day. In view of this traffic, and the consistent growth of Toronto, the new station has been constructed of such proportions that it is estimated conservatively that when the entire project is completed, including all track

facilities, there will be little difficulty in handling 10,000 passengers an hour.

General Layout of Facilities

The new union station is a steel skeleton structure supported on massive concrete foundations which were carried down to rock in open caissons. All of the steel-work in the exterior walls is thoroughly encased in concrete, and the face stone of the building is backed with brick and hollow tile. The roof covering of the station is of two principal types, built-up tar and gravel, and

four-story wings of the building, reaching a maximum height of about 125 ft. above the street level. The exterior face of this section has been made pretentious by a colonnade of 22 massive limestone columns of Grecian architecture, surmounted by a massive limestone facade bearing the inscription, "Union Station."

Entrance to the station, which sets back approximately 50 ft. from the property line of Front street, is through two large porticos at the east and west ends of the colonnade. These entrances lead direct to the main portion of the station known as the ticket lobby, the floor level



A View Through That Portion of the Train Concourse Already Completed

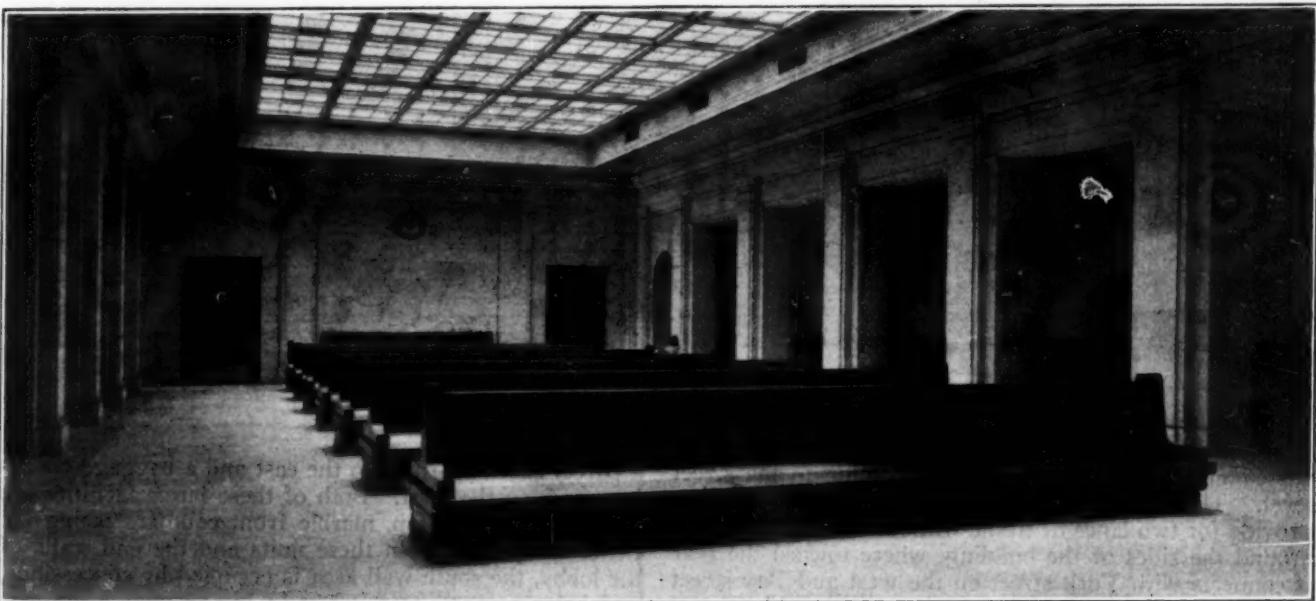
sheet copper, the latter being used on all pitched surfaces. All of the main station floors, and the heavy traffic basement floors of the building are of reinforced concrete, faced with suitable wearing surfaces. All other floors, the partitions, and firewalls are constructed of hollow building tile.

In studying the layout of the new station it is essential to bear in mind that it is a through station rather than a stub terminal, that eventually all of the station tracks will be elevated and reached through a subway train concourse extending beneath them, and also, that the passenger station facilities are confined almost entirely within the main central unit of the unusually long passenger station building.

This unit of the station, which covers an area approximately 260 ft. long by 86 ft. wide, towers above the

of which is approximately one foot above the level of Front street. Within this lobby, which will be used primarily by passengers leaving Toronto or transferring at this point, are found the principal station facilities, supplemented by the waiting room and dining facilities afforded in the west wing on the same level. Centrally located along the south side of the ticket lobby is a high, arched exit passageway leading to a wide gently-sloping ramp, which connects the ticket lobby with the train concourse. In this concourse, the floor level of which is $6\frac{1}{2}$ ft. below the level of the ticket lobby, there is complete separation of inbound and outbound passengers, with provision for the rapid handling of passengers transferring from one track platform to another.

The level directly below the ticket lobby is arranged for the exclusive use of passengers arriving at Toronto,



A Portion of the Main Waiting Room

and has been designated the exit concourse. This lower level, which provides facilities for passengers arriving at the station, is directly connected to the train concourse along the south side, through two low-level ramps. Exit from this level to the street is provided through a wide gently-sloping ramp, centrally located along the north or front side of the concourse. This ramp opens out



The Lunch Room Can Serve 118 Patrons at One Time

on to a ramp loggia, with ramps extending upward in two directions parallel with the face of the building, to the entrance portico levels at each side of the ticket lobby.

For the convenience of passengers desiring to leave the station by taxicab, a low-level driveway extends along the full length of the entire building, so that

wide stairways, one at each end of the exit concourse, which lead to the lobby level.

Ticket Lobby Affords Large

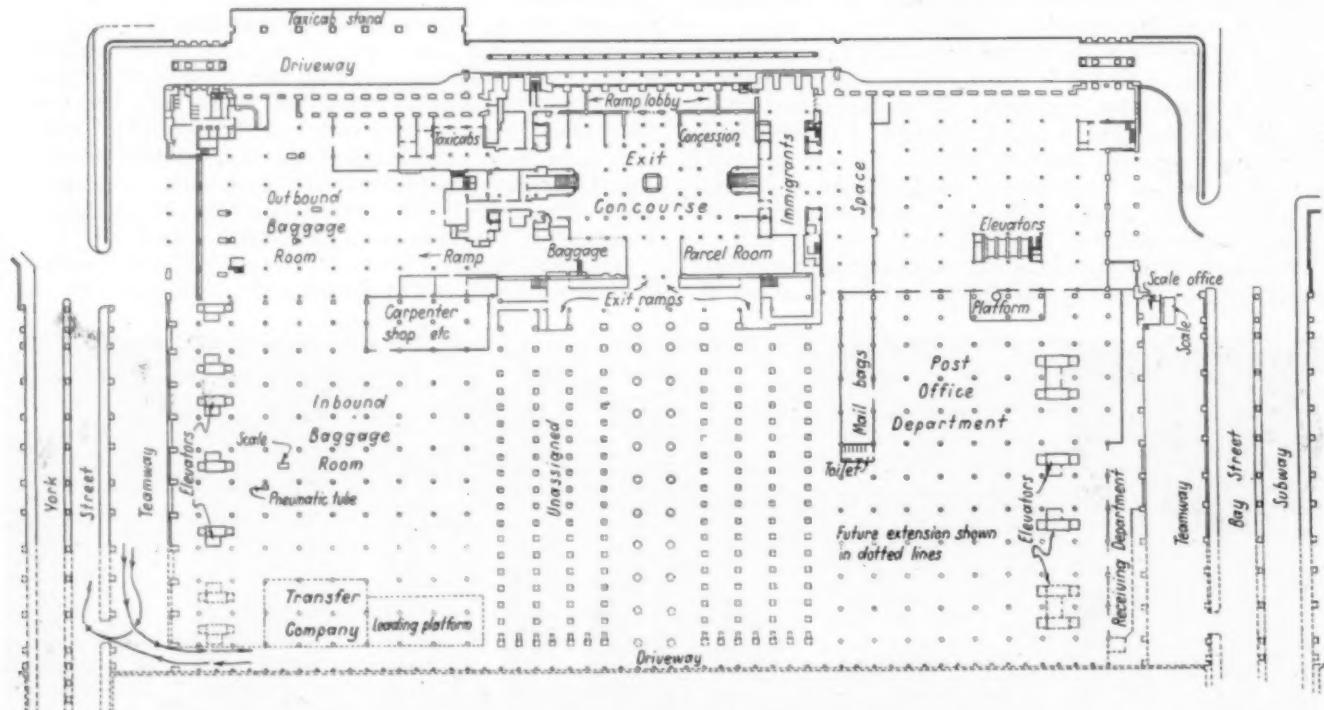
Unobstructed Floor Area

Within the main room of the station, which is about 260 ft. long by 90 ft. wide, and covered by an arched ceiling 88 ft. above the floor, facilities have been arranged with the view of affording maximum convenience to patrons. These facilities line the side wall areas, leaving the main part of the floor unobstructed except for a circular information desk located centrally in the lobby, and the two stairwells leading to the sub-level exit concourse.

The ticket counters occupy the entire space between the entrance porticos on the north side of the lobby, and are divided into two equal units, the counter on the west side being used by the Canadian National while that on the east side is used by the Canadian Pacific. Where these two counters join in the center of the lobby, a portion of each is used by each company for special travel information service.

The ticket counters provided are of the low, unenclosed type, and have marble fronts surmounted by low bronze plates, about 12 in. high, to give some privacy to the clerks and to their working space. Openings in this plate, forming the ticket windows, are covered by bronze grillages, and intermediate between these openings, special ornamental lighting fixtures have been placed to enhance the appearance of the counters and to assist in illuminating them.

On the opposite or south side of the ticket lobby is the ramp chamber leading to the train concourse, with



Floor Plan of Lower Level

passengers may reach cabs without coming to the street level. This driveway, which is of sufficient width to provide for two lanes of traffic without difficulty, extends around the sides of the building, where toward the rear it connects with York street on the west and Bay street on the east. Passengers in the exit concourse who desire to reach the main ticket lobby may use either of two

a parcel checking room to the east and a baggage checking room to the west. Both of these latter facilities are fitted with bronze top, marble front counters facing the ticket lobby. Between these units and the end walls of the lobby, the south wall area is occupied by concessions, as is also a small area centrally located along the east wall. At the west end of the lobby, the wall space is

occupied by two large entranceways leading to the station waiting room and dining room facilities, and between these a small doorway opens on to a stairway which leads down to a taxicab and custom's department lobby on the exit concourse level.

Of special significance is the architectural effect which has been embodied in the ticket lobby. Throughout, the interior walls are faced with rough-sawn Zumbro Travertine, the floor is of pink and gray Tennessee marble, while three-color panel work in Gustavino tile is employed in the long-span, high-vaulted ceiling and the archways which surmount the entrance vestibules. The plainness of the north and south walls is broken by five large sectional windows, while frosted glass, set in heavy ornamental iron grillings is used liberally in the entire upper two-thirds of the east and west end walls.

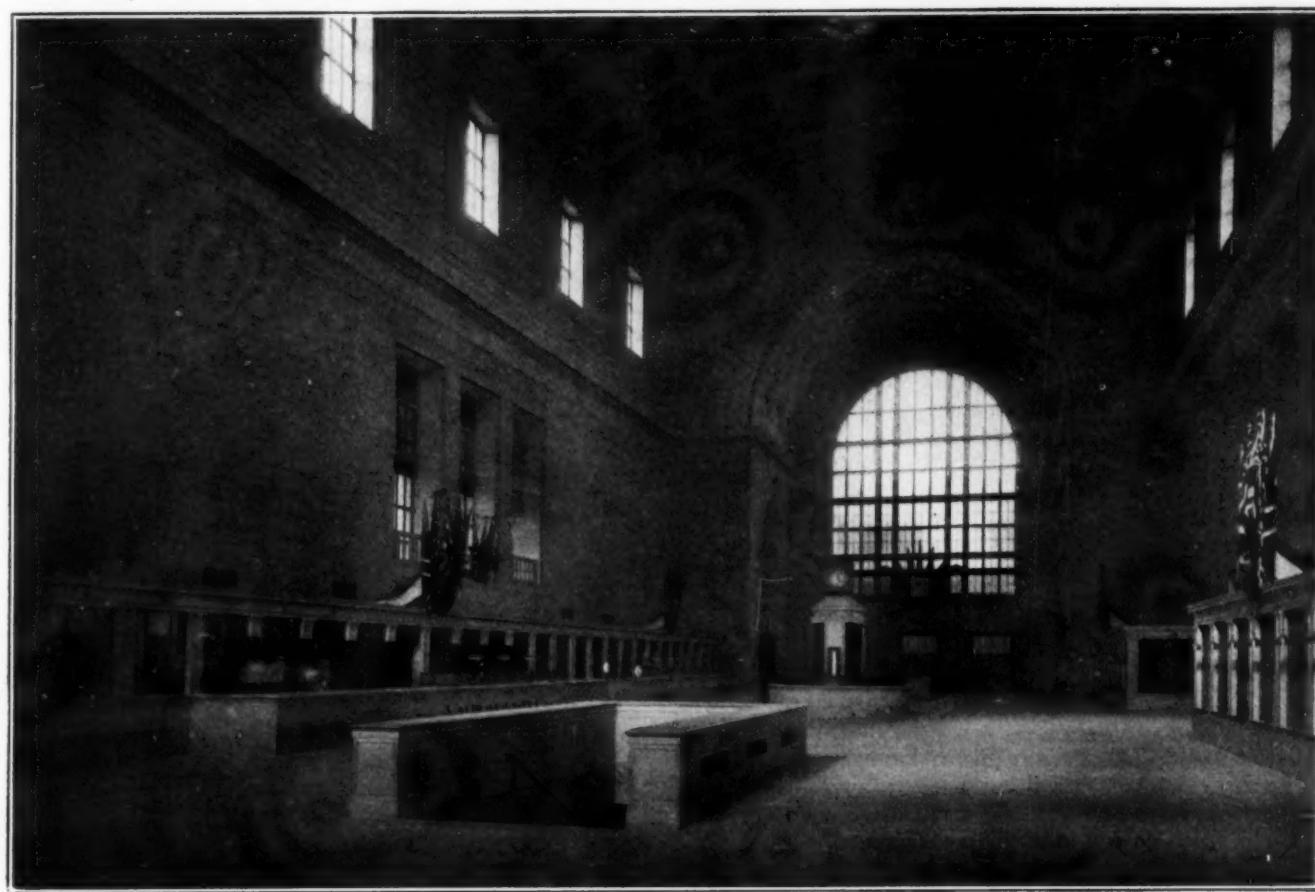
Harmonizing with this general treatment of the interior, pink Tennessee marble facing is used on the ticket counters, the information booth, the baggage and parcel checking counters, and the balustrades around

the waiting room consist entirely of rows of back-to-back quartered-oak settees occupying the center of the floor, supplemented by single settees of similar material, which line the wall areas.

The facilities auxiliary to the waiting room for the special convenience of men and women patrons lie along the south side of the west wing, immediately adjacent to the waiting room. For men, these consist of a small smoking room, a six-chair barber shop, a shower bath room, a wash room and a lavatory; while for women they include a large rest room, a lavatory, a bath and dressing room, and a manicuring and hair-dressing shop. Other auxiliary facilities in this area include a hospital room and quarters for a matron. The barber shop, baths and lavatories have tile walls and floors, while the women's rest room is provided with a parquet hardwood floor with wall panels of fumed oak.

Dining and Lunch Room Facilities Are Adequate

The dining facilities of the new station are unusually attractive. The main dining room, which adjoins the



The Interior of the Spacious and Attractive Ticket Lobby

the stairwells leading to the exit concourse, all of this marble work being set out by heavy bronze trim.

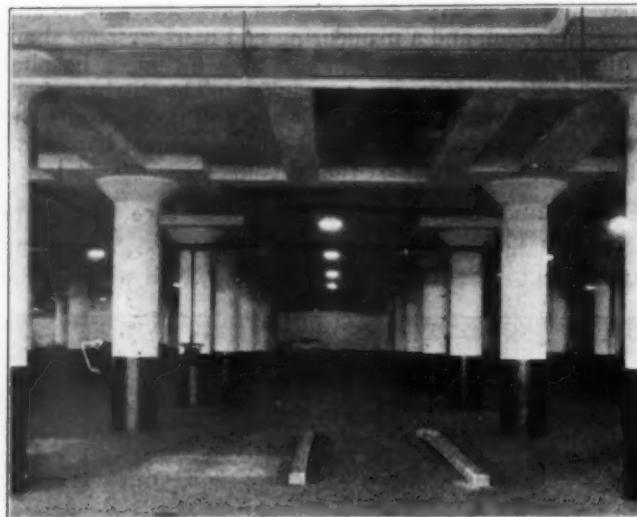
Waiting Room Offers Many Conveniences

The waiting room as already mentioned, is located on the main floor level in the west wing, directly accessible from the ticket lobby through two wide entranceways. This room is 108 ft. long by 64 ft. wide, and like the ticket lobby is finished throughout with Zumbro Travertine walls, and with a pink and clear Tennessee marble floor. The ceiling of the waiting room is entirely of glass, forming the base of the light well which extends through the center of the west wing. The fittings of

west end of the general waiting room, occupies a clear area, 64 ft. long by 54 ft. wide, interrupted only by a row of columns along the north and south sides of the room to support the ceiling structure. The floor of the dining room is of oak parquetry, the ceiling is formed by a skylight similar to that in the waiting room, and the walls are faced with quartered white oak paneling surmounted by a wide frieze of carved oak which extends completely around the room. Adding to the restful effect of the interior decorations of this room, are ornamental side wall lamps provided along the recesses at the sides of the room, and indirect illumination around the edges of the ceiling. The dining room has space for

45 tables, seating from two to six persons each, and, harmonizing with the interior decorations of the room, all tables, as well as other furniture, are of oak.

A special small dining room has also been provided to accommodate private dinner parties. This room, which is 50 ft. long by 16 ft. wide, is finished throughout with hardwood floors and plastered walls, and through a special arrangement of folding partitions which fit into recesses in the side walls, can be divided into four



Looking Through a Section of the Postal Area on the Lower Level

small private dining rooms approximately 12 ft. by 16 ft. each.

The lunch room lies immediately north of the waiting room and extends for a distance of 130 ft. along the front face of the west wing. This room, which is 35 ft. wide, has been fitted with gray Missisquoi marble walls and flooring, and has a white plaster ceiling. Owing to the shape of the room, it has been fitted with one unusually long U-shaped lunch counter which is capable of serving 118 patrons at one time. Supplementing this facility, tables have been placed along the north side of the room.

The kitchen facilities in connection with the lunch and dining rooms occupy practically the entire space on the main floor across the extreme west end of the west wing. In this location, which is within easy reach of the dining and lunch rooms, provision has been made for a pantry, a china wash room, a linen laundry, a bakery, a cold storage room, and a butcher room. The entire area devoted to the kitchen facilities on the main floor, while irregular in shape, is approximately 130 ft. long by 70 ft. wide. This is supplemented by additional space allotted to the commissary department in the basement level just below the kitchen facilities, this space being occupied primarily by a refrigeration plant, an employees' lunch room, locker and wash room facilities for kitchen employees, and special segregated areas for the storage of foodstuffs. One of the most interesting features in connection with the kitchen facilities is the large amount of modern equipment installed to facilitate the serving of a large number of patrons with a relatively small number of employees.

Separate Exit Concourse Precludes Congestion

The exit concourse, which lies in the low level directly beneath the ticket lobby, is one large room with a comparatively low ceiling, occupied by a number of facil-

ties of widely varying character. Practically all of these facilities are located along the wall area, so that maximum unobstructed floor space is afforded in the center of the room to facilitate the movement of outgoing passengers, the only obstruction within the main floor area being an enclosed rectangular information booth, centrally located, so that it can be seen readily from all parts of the concourse. From this concourse passengers have several means of exit; straight ahead up the ramp at the front of the station leading to the entrance porticos; to the right or left to broad stairways leading to the ticket lobby; or toward the left to the taxicab stands and arcade.

The special facilities on this level, aside from concessions, shop areas, telephones, etc., consist principally of a parcel room, a baggage room, an immigration room, and taxicab office facilities. Both the parcel checking and baggage checking rooms on this level lie immediately beneath the similar facilities on the ticket lobby level, the parcel room lying to the east of the approach to the exit lobby, while the baggage room lies to the west. Both of these facilities have counter fronts facing the concourse, and are connected with the similar facilities directly above by means of mechanical conveyors of various types, which make possible the ready transfer of parcels or baggage between floors. This equipment is of special value in the case of the baggage rooms where there is constant need for such transfers.

Immigration Room

The immigration room, which lies along the east side of the exit concourse, is in reality a large area divided into a number of rooms set aside for offices of the immigration department, and also to accommodate large



Looking West Along the Massive Limestone Front of the Station

numbers of immigrants who may arrive at the station and be detained while awaiting some connection.

The interior finish of the exit concourse is in keeping with the rest of the station, except that owing to the lowness of the ceiling, little attempt has been made to incorporate special architectural features. The walls of this unit are faced throughout with Missisquoi green marble, as are also the massive columns on this level, supporting the ticket lobby floor. The ceiling is plas-

tered and ornamented with special lighting fixtures, and the flooring is of terrazzo tile, the plainness of which is broken up by wide dark tile borders.

Train Concourse Provides Separate Outlets for Incoming Passengers

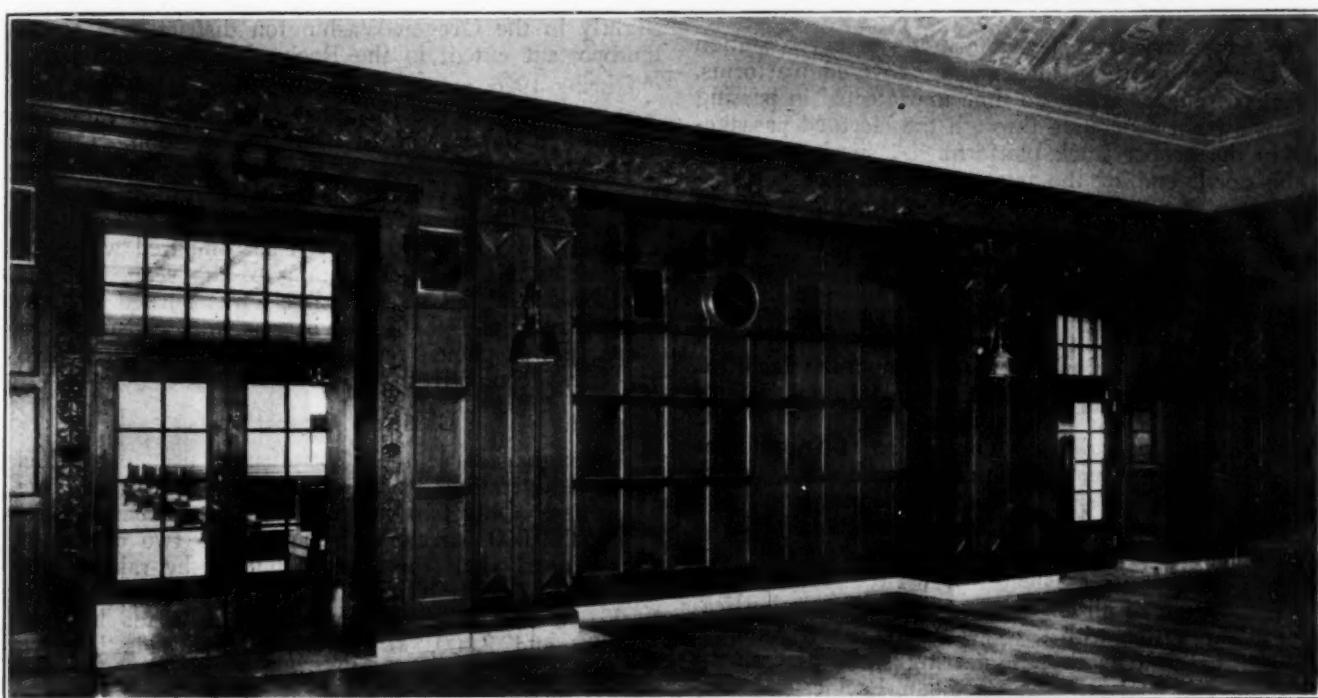
One of the most interesting features of the new station from the standpoint of its ability to handle large crowds effectively, is the layout of the subway train concourse, which when completed will serve 12 station tracks and provide for the complete separation of inbound and outbound passengers. At the present time the train concourse extends only 160 ft. from the rear of the station building, or sufficient to carry six tracks, the space immediately beyond the unfinished end being occupied by low-level through tracks which now serve the station. On both sides of the train concourse structure, a reinforced concrete deck structure extends to York street on the west and to Bay street on the east, this structure forming the base for the future elevated

ing from it, while passengers entering the station from the track level will be required to use the stairways on either side leading to the exit passageways and ultimately to the exit concourse. For the convenience of transfer passengers changing trains at the station, special transfer corridors, regulated by doors, connect the exit passageway on each side with the main part of the train concourse.

The interior finish of the train concourse, like the rest of the station, is both attractive and practical, the walls and columns being faced with Lombardic mosaic tile, rising to a plastered ceiling, the floor being finished with terrazzo tile, while all of the benches and the wood-work about the train gates are of fumed oak.

Baggage, Mail and Office Facilities

The baggage-handling facilities at the station, occupy practically the entire basement level of the west wing of the station building and extend beneath the full area of the elevated track deck west of the train concourse.



A Section of the Dining Room, Showing the Elaborate Interior Finishing

tracks at the rear of the station, and affording a clear working space beneath them.

The main portion of the train concourse, which is used as a passageway and waiting room for outbound passengers, is approximately 75 ft. wide, and is flanked on each side by stairways which will lead eventually to the intermediate platforms of the completed station track layout. The east and west sides of this main concourse, between the stairways, are lined by retail store areas, 28 ft. deep. Outside of these stores are exit passageways, about 16 ft. wide, which in turn have separate sets of stairways leading down to them from the track level. These passageways extend to the station end of the concourse and are then joined together at the level of the exit concourse beneath the ticket lobby, through inclined ramps which slope to a common level directly beneath the inclined ramp which connects the ticket lobby with the main outbound area of the train concourse. With this arrangement, all outbound passengers will use the main central concourse area and the stairways lead-

This gives the baggage department over 85,000 sq. ft. of working space on the level beneath the tracks. Within this area, which is floored with asphalt mastic over a concrete base, outbound baggage is handled toward the front of the building, while inbound baggage is handled in the space immediately beneath the elevated track structure. When the track work is finally completed, freight elevators will connect each station platform with the baggage space beneath, thereby precluding all trucking over the tracks.

The three floors in the west wing of the new station building above the ground floor are occupied entirely by railroad offices, which are finished with plastered walls and ceilings, oak trim, and composition covered floors. The east wing of the station, from the sub-level to the top floor, is occupied by the Dominion post office department, and has been laid out and equipped with the most modern type of conveyors and mail handling facilities. The entire station project at Toronto has involved the expenditure of approximately \$6,000,000, and is related

to harbor development, municipal, and other railroad projects which will cost approximately \$100,000,000 when completed.

Incomplete Track Elevation Work

Necessitates Temporary Facilities

Until the grade separation work at Toronto, which involves several million yards of fill over a distance of approximately 18,000 ft., and the construction of 13 street subways, is completed, the new station must be operated with its tracks at grade, south of the incomplete train concourse. As it is expected that this condition will exist for about two more years, a relatively elaborate arrangement of temporary facilities has been resorted to in order to afford convenience to passengers in passing to and from trains. This consists of an entirely enclosed frame platform passageway extending in a north and south direction, above, and just west of the train concourse, and connected to the concourse exit stairways at the north end by enclosed passageways, and to the temporary track platforms at the south end by enclosed stairways.

The temporary track layout consists of seven station tracks served by three intermediate covered platforms, so that passengers are at no time unprotected in passing from the train concourse through the elevated passageway to the proper track platform. A special stairway at the north end of the temporary overhead passageway makes it possible for passengers leaving trains to use the exit facilities at the station in the same manner as they will be used permanently when the station is completed, that is, incoming passengers are directed to this stairway which leads to the exit passage along the west side of the train concourse. Thus it is evident that through this arrangement of temporary facilities, many of the advantages of the finished station will be in effect until the station is completed.

The building of the new union station at Toronto has been handled since its inception by the Toronto Terminals Railway Company, a company formed by, and acting in the interest of the Canadian roads involved in the new station project. As chief engineer of this company throughout its existence, J. R. W. Ambrose has had full charge of all engineering and construction features in connection with the new station. Mr. Ambrose has been assisted by the engineering staffs of both the Canadian National and the Canadian Pacific, and during the past two years more particularly, by P. B. Motley, engineer of bridges of the Canadian Pacific who has had general supervision over the design and construction of the train concourse and the elevated track structure at the rear of the station.

The architects for the station building were Ross & Macdonald, and Hugh C. Jones, of Montreal, with whom J. M. Lyle of Toronto was associated. The general contractor for the station building was the P. Lyall and Sons Construction Company, Montreal, which also handled the construction of the train concourse. Almost without exception the station has been constructed by Canadian concerns and workmen, and incorporates products manufactured or finished within the Dominion.

A MAP OF NEW YORK CITY, brand new, 14 in. x 22 in., is the latest publication of the passenger department of the New York Central. The map is thoroughly indexed and shows the locations of 150 hotels, 100 theatres, 50 steamship docks and 70 other points of interest. The other side of the sheet contains interesting illustrations and data concerning the city, and the whole folds into a very thin pamphlet of pocket size.

Consumption of Fuel Oil Decreased Slightly

INCREASED prices of fuel oil, especially in the South Central states, and increased efficiency in its utilization, especially in California, Texas, and Louisiana, caused a slight decrease in consumption by the railroads of the country in 1926, as compared with 1925, says the United States Bureau of Mines, Department of Commerce, in a recently issued report. Although the general consumption of fuel of all kinds by Class I railroads increased 0.53 per cent in 1926 over 1925, the quantity of fuel oil consumed by locomotives on Class I railroads decreased 0.33 per cent, and the fuel oil consumed by all railroads for which information is available decreased 0.9 per cent, from 69,461,119 barrels in 1925 to 68,836,850 barrels in 1926.

The principal decreases took place in the California district; in the South Central district; and in the Atlantic district. Railroad fuel oil consumption increased slightly in the Oregon-Washington district, and to an unimportant extent in the Rocky Mountain district.

During 1926, a total of 71,446,956 barrels of fuel oil was purchased by the 152 Class I, II, and III railroads included in the Bureau of Mines compilation. Of the total amount purchased, 68,836,850 barrels was consumed, and 2,610,106 barrels added to the quantity in storage. Railroad stocks of fuel oil at the end of 1926 amounted to 16,541,845 barrels, as compared with 13,931,739 barrels at the beginning of the year. Of the total consumed, 59,329,690 barrels was burned as locomotive fuel, and 9,507,160 barrels was consumed in shops, power plants, ferry boats, and other uses than for firing locomotives.

Little in Operation

Although each of the 152 railroads used some fuel oil in its operations, comparatively few used it in large quantities. Only two railroad systems purchased more than 5,000,000 barrels each; and these two consumed jointly nearly half the fuel oil burned by railroads in the United States. Only 6 railroads purchased between 2,000,000 and 5,000,000 barrels, 19 railroads between 500,000 and 2,000,000 barrels, 19 railroads between 100,000 and 500,000 barrels, and 8 railroads between 50,000 and 100,000 barrels, while 98 railroads purchased less than 50,000 barrels during the entire year.

As in 1925 more than four-fifths of the oil burned by railroads in the United States was consumed in the South Central States and in California. Railroads operating in these two regions consumed 56,458,246 barrels, or 82 per cent of the 1926 total. A little over 8 per cent was consumed in Oregon and Washington, and a little over 6 per cent in the South Atlantic region. The remaining 4 per cent was consumed in the North Central States and in the area adjacent to the Wyoming and Montana oil fields.

From 15,577,670 barrels in 1906 the consumption of oil as a locomotive fuel has grown more than fourfold in 20 years.

No uniform national tendency either toward the conversion of the coal-burning locomotives to oil burning or the reverse, can be deduced, the report says. The quantity of fuel oil used each year varies in each region with the relative costs of oil and coal, the volume of traffic, the adoption of oil burning by railroads previously burning coal or the reverse, and the efficiency of burning.

The Future of Air Transport*

Rapid progress being made in speed, safety and reduced costs—Railroad co-operation invited

By Harry F. Guggenheim

President, Daniel Guggenheim Fund for Advancement of Aeronautics

In discussing aviation I want to consider in particular the use of the airplane as a unit in a regular, well-organized, transportation system. Will the systematic movement of goods and people by air play an important part in this generation in which we are living?

There seem to me to be three factors in air-transportation that will govern the answer to this question. They are: 1. Speed. 2. Safety. 3. Cost.

The first factor of speed represents today the outstanding advantage that the airplane possesses as a mode of transportation. The history of transportation of all kinds is a history of ever increasing speed. Today the average cruising speed of the best modern airplane is about 90 miles per hour. There are no figures available for the average speed of passenger trains, but for freight trains—for which, of course, the figure is much lower—the speed is averaged officially at about 12 miles per hour. In addition to the airplane's advantage in speed its route is appreciably shorter than any route by land. As the crow flies, in other words, is the shortest way home. I have made a comparison of the mileage by railroad and the mileage by air between some of the principal points in the United States. This study indicates that by air route there is a saving of approximately 10 per cent over the tortuous route of the railroad. An analysis of this sort, I realize, is open to criticism, but it indicates the possibilities of materially shortening the distance between two given cities by air travel.

Although the present average speed of the airplane has been given as 90 miles per hour, the possibilities for the future are beyond safe prediction. Even while we are discussing this subject here, the speed is being increased an additional 30 miles per hour for commercial work. Within the next few months an air passenger service will be inaugurated between Los Angeles and San Francisco, and the cruising speed of the airplanes will be 120 miles per hour. As you all know, man has already flown at a speed of over 300 miles per hour. Although it seems fantastic to us to conceive of traveling commercially at that speed today, nevertheless, the history of the past and especially the history of aviation is evidence that the fantastic of today becomes the commonplace of tomorrow.

A paragraph from the London Times of October 8, 1829, gives an interesting indication of the change in

conceptions of speed. Referring to Stephenson's Rocket, it says: "It shot along the line at the amazing rate of 30 miles an hour. It actually made one giddy to look at it and filled thousands with lively fears for the safety of the individuals who were on it."

The second factor "Safety" is the important factor that will govern the acceptance of the airplane. In the past public support has been withheld largely for two reasons.

In the first place man has a traditional dread of using an unaccustomed medium. The fear of air flight is similar to the dread held by the ancients of sailing on the sea. This traditional dread is fast disappearing,

I think it fair to say from observation, that the children of today have not the slightest fear of air travel. Their greatest ambition is apparently to fly, and when they do, it is with delight and absolutely without fear.

Increasing Safety of Air Travel

Secondly, this traditional fear of flying has perhaps been stimulated by the sensational recital of airplane disasters. Airplane accidents are still news and are generally of such a spectacular nature that they have reached the front

page of the newspapers and are thus emphasized upon the public mind. Will Rogers, with the philosophy that so often characterizes his humor, has said of this:

"Five people killed in plane yesterday and it is headlined today in every paper. Saturday in Los Angeles at one grade crossing seven were killed and six wounded and the papers didn't even publish the names. It looks like the only way you can get any publicity on your death is to be killed in a plane. It's no novelty to be killed in an auto any more."

Hardly any of the accidents that have been brought so vividly to public attention have any place in commercial aviation of today. Nearly each and every one of them can be included in one of the following categories:

1. Accidents that took place in pre-war flying were often due to structural failure and inexperience, natural to a new art. Mechanical failures, such as the breaking of a wing, for example, are today unknown in normal flying with the best modern equipment.

2. War-time accidents are still actively in our memories and we have impressions of heroic air fighting and air crashes. However, these accidents should be no more attributed to flying than the dangers of cavalry charges should be confounded with those of horseback riding.

3. Stunt flights probably have not taken life in great numbers, but on account of their extremely spectacular nature,

Clarence Chamberlain to the Railroads—

"Transportation by air is here and ready to go. We should like to work with you, but if you won't work, we will fight. I have heard it said that you were a bit slow connecting up with the buses and the trucks. Well, you don't want to let us get too much of a head start before you join in with us."

The above quotation is extracted from the remarks of Clarence Chamberlain, the trans-Atlantic aviator, before the New York Railroad Club on December 15.

* Abstract of an address delivered at the New York Railroad Club annual dinner on December 15.

accidents from these flights have been closely followed by the public.

4. Reckless private flying has been the cause of many accidents, but here again this is no more a normal danger of flying than the reckless driving of a young man in a motor car, which crashes into a telegraph pole, is a normal danger of motoring.

5. Experimental flying constantly causes the death of many gallant aviators. These are pioneers who, like other pioneers throughout the ages, are thoroughly conscious of the danger and make the supreme sacrifice so that humanity may progress.

6. Military and naval aviation have in the past accounted for nearly all the flying, but that time is rapidly passing. War is not exactly a safe pursuit, and the dangers of military and naval aviation are an item in the price we must pay for preparedness in time of war. But accidents in this necessary service must not be laid at the door of commercial aviation.

Commercial aviation should not be liable to any of these dangers. Transportation of passengers under properly organized conditions has reached a state of safety comparable with other means of transportation. Proper conditions for safety in flying include the following:

1. Highly skilled and experienced pilots are essential. In the hands of a skilled expert the airplane is safe; in the hands of an amateur it is distinctly unsafe. With progress in design, this extreme dependence on the skill of the pilot will diminish.

2. Adequate equipment—airplane, engine, and instrument—is of primary importance. The best modern airplanes are of light, but reliable structure. Modern engines have reached an extraordinarily high state of development as demonstrated by endurance flights of 50 to 60 hours. Multi-engined planes, designed so as to fly with one or more engines out of commission, offer an additional safeguard.

3. The ground organization should include a highly trained operating personnel for the care and maintenance of flying equipment, landing fields and airways.

4. The regular airways should be lighted for night flying and have emergency landing fields at convenient distances.

5. A meteorological service for aviation assures accurate knowledge of weather conditions. The development of this service not only for the reporting of actual weather conditions on the route, but also for the purpose of short time forecasting is still in its infancy in America. Along with this, a communication service from the ground to the plane is a final essential, reporting weather conditions and position when visibility is bad.

Fog Problem Still Unsolved

For flying under safe conditions today it is assumed that flying through fog, except for short distances, will not be undertaken. With the perfection of radio direction finders and the radio beacon, it is today feasible, thanks to the perfection of flying instruments, for an expert pilot to fly between two given points in a fog. The matter of landing, however, is of a more serious nature, and the solution for landing in fog has not as yet been found. Research and experimental work is now underway on fog dissipation, fog penetration by rays, and the perfection of instruments that will register the plane's precise elevation from the ground.

Although the airplane of today is a safe mode of conveyance, under properly organized conditions, the airplane of tomorrow due to aerodynamic improvements will compare favorably with the motor car in safety and ease of operation under all conditions. In order to hasten the development of the aerodynamically safe plane, the Daniel Guggenheim Fund for the Promotion of Aeronautics has organized a Safe Aircraft Competition. The rules of the competition require among other things, that the airplane land more slowly, roll only a short distance after landing, be able to rise sharply and safely over obstacles surrounding a field, remain in perfect control at the stall and in all other flight attitudes and be inherently stable when, owing to weather conditions, the pilot cannot himself maintain an even keel. Most of these problems have been solved individually in different planes and it is now necessary to coordinate them into one plane which will be the safe airplane.

Already entries have been received for this competition from some of the most important airplane manufacturers of several countries.

Comparative Costs

The third and last point for consideration in estimating the possibilities in air transport is its cost of construction and operation. At this particular point in aviation development, it is futile to present elaborate statistics of an economic nature. The old epigram that "figures don't lie, but liars figure" is peculiarly applicable in a new and fast changing industry. However, there are some fundamental economic considerations in air transport which offer opportunity for comparison with other forms of transportation. For example, the cost of roadways and railways, including not only the tremendous cost of surfacing and laying rails, but also the cost of grading, driving tunnels, building bridges and snowsheds, together with all the other appurtenances of railroad building, is a cost that is almost entirely eliminated in the construction of an airway. In addition, the cost of maintenance of an airway is but an insignificant sum in comparison with the cost of maintenance of roadways and railways.

Both the cost of construction of airways and their maintenance has been properly assumed by the federal government on the same theory that has prompted the federal government to construct and maintain seaports. I understand that there has been some criticism of this governmental aid to air transport. I think this is an unjust criticism, and its unfairness will be readily recognized by railroad men in view of the tremendous sums of money spent by the government in support of the railroads during their pioneering days.

In motor car operation, with which we are all more or less familiar, there is another interesting comparison in the consideration of airplane costs. A modern single-engine five passenger airplane equipped with a Wright Whirlwind motor costs about \$12,500. The price of the engine is about \$5,000 and is based on a production last year of approximately 350 engines. The price of the airplane, which represents the balance of the \$12,500, is based on a production of about 50 airplanes per year. You can readily imagine how greatly the cost of production of plane and motor can be reduced where the output is placed on a real quantity basis. As a matter of fact, airplanes and airplane motors are comparatively simple structures that will lend themselves to low cost of production.

The cost of operation of an airplane is also comparatively small. The gasoline consumption of the type of plane previously mentioned, equipped with a 200 h.p. Whirlwind motor, is approximately 13 gallons per hour, and approximately one pint of oil is consumed per hour for a 90-mile per hour speed. Compare this with the consumption of gasoline and oil of your motor car for a run of 90 miles. Also, the only wear on the two tires of an airplane is in the few moments during which the airplane is rising from the ground or landing on it.

Although these comparisons, I think, are fundamental and significant of future development, one should mention in all fairness the present day price of multi-engine passenger equipment, which is much more costly to purchase and operate. The most modern three-engine equipment capable of carrying ten passengers and two pilots, and 500 lbs. of baggage, costs in the neighborhood of \$60,000. At a price of around 12 cents and possibly ten cents per mile, if reasonably full loads can be maintained, a commercial success should be possible under highly efficient operation.

Greater Volume of Business Will Decrease Expense

The three important factors that make up the present day cost of airplane operation are overhead, insurance, and depreciation and obsolescence. Obviously, since airplanes today carry only a handful of passengers, this overhead expense is bound to be disproportionately high. As the volume of business increases, the figures for overhead will be in better proportion to the revenue.

Insurance is one of the outstanding problems of the commercial aviator. The present almost prohibitive insurance rates will be slashed when the public and the insurance companies learn to differentiate between the risks involved in passenger air transport and in the other more spectacular and non-commercial phases of aviation.

The major cost of airplane operation, however, is depreciation and obsolescence. Although there is little accurate knowledge of the depreciation rate of modern airplanes, nevertheless at the present time every capable airplane operator writes off his equipment over a period of between two and three years. With the lightning-like changes that are taking place in the airplane, the conservative operator will anticipate a revolutionary alteration in his equipment at the end of between two and three years.

In considering the economic factors of air transport, one should not overlook the opportunity of operating small units, which has the obvious advantage of small initial capital expenditure and permits a gradual expansion as business justifies. On the whole, therefore, future costs of airplane operation will compare favorably with the cost of other forms of transportation, and in addition it must be remembered that the American public is always willing to pay more for better service, if necessary.

Air Transport's Disadvantages

There are certain disadvantages in air transport today that are gradually being overcome. One of the most important is the excessive time needed to reach a city from its airport. For example, when Lindbergh flew from Detroit to New York in the record time of two hours and 43 minutes, he consumed over an hour more in traveling between the airport and the heart of New York. In aviation of the future, with the development of both airplanes and landing facilities, passengers will be discharged within a very few minutes of the centers of great cities.

Another disadvantage of air transport for the moment is the impracticability of passenger service at night and of long oversea flights in heavier-than-air craft. However, you are fully aware that night flying is continuing successfully over the air mail routes, and the record of this year has given us a dramatic demonstration of successful oversea flights.

That these demonstrations, with the primitive equipment of today, are the fore-runners to commercial flights of the future with improved and adequate equipment, there can be little doubt. We must constantly bear in mind that the airplane of today is merely the adaptation of a war instrument for commercial purposes. The commercial development in aviation has just begun, and the truly commercial airplane is still in process of development.

Railroad Co-operation Invited

At the present moment aviation needs the support of the railroads. With the highly developed railroad system in the United States, the present state of airplane development, can supply only a few commercial opportunities for passenger transportation by air. The great

opportunities for air transport at the moment lie in localities where a highly developed railroad system does not exist. The outstanding example of this is the air line that operates on the Magdalena River in Colombia, where by steamer the passage takes eight to ten days, and by seaplane the same journey is accomplished in eight hours.

The present opportunities for air transport in the United States are, in my opinion, those where the airplane ride will not be over three or four hours of daylight flying, where the competing transportation system is not good, or where a rail or sea connection can be made with some other transportation system that makes possible an important saving of time. This specification obviously points for the moment to the use of air transport.

The economic advantages of the co-ordination of rail and air transportation are very great from the air operator's standpoint:

First: His large expense of advertising and ticket selling will be eliminated; and second, the opportunity which the railroad would offer of taking a limited number of passengers off the trains at certain points to fill the airplane is obviously of the utmost importance. In addition, under unfavorable weather conditions of fog and sleet, the only two conditions under which airplanes cannot safely travel at the present time, the railroad facilities could be used without too great inconvenience to passengers.

This is the situation as it exists today. Tomorrow there may be, and undoubtedly will be, a complete re-adjustment in these economic factors. For example, to consider just one of them: should the commercial cruising speed of the airplane be increased from 90 to 180 miles an hour, the commercial opportunities for air transport would be enormously extended, in spite of the country's highly organized railway system.

The developments with which the aviation industry is now experimenting are developments which almost over-night may establish a transportation system which the railroads will need as much as aviation needs the support of the railroads.

I. C. C. Orders Increase in Sugar Rates in Southeast

WASHINGTON, D. C.

AN indication that the Hoch-Smith resolution may be a two-edged sword has been given by the Interstate Commerce Commission in its report and order made public on December 15 in connection with its Southeastern Sugar Investigation and related cases, in which it prescribed an upward revision of sugar rates in southeastern territory and from north Atlantic ports to points in southern states.

In sugar the commission has found a commodity which it believes can properly stand a greater share of the "transportation burden" and the Hoch-Smith resolution is cited as one reason for prescribing a basis of rates which, while including both, increases and decreases, is slightly higher than was proposed by the railroads. Without specifically so finding, the commission's report indicates that one of the reasons may be that it considers that sugar rates have been somewhat depressed by competition, but the report does not indicate that the new rates will provide any considerable increase in carriers' revenues by way of offset to the

reductions which have been ordered in certain agricultural products affected by depression.

The proceeding of investigation into southeastern sugar rates on the commission's own motion, with which were combined some formal complaint and fourth section cases, was begun before the passage of the Hoch-Smith resolution. However, the majority report, by Commissioner Eastman, says that the commission's "ultimate duty is to determine, not necessarily a level of readjusted sugar rates which will neither increase nor decrease materially the aggregate revenues from this traffic, but rather a level of rates under which sugar will contribute its proper proportion of the revenues of the carriers, taking into consideration all pertinent factors, including the value of the service." "The necessity for approaching the problem from this standpoint," he adds, "has been emphasized by the Hoch-Smith resolution."

Commissioner McManamy dissented on the ground that the record afforded no justification for rates not only higher than the commission had previously found to be reasonable but higher than proposed by the roads. Commissioner Woodlock, in a dissenting opinion concurred in by Commissioner Taylor, took the position that higher rates should have been allowed, and Commissioner Hall did not participate in the disposition of the case.

General Basis

The general basis of carload rates prescribed by the commission is 27.5 per cent of the corresponding first-class rates prescribed in the Southern Class Rate Investigation, except that a different basis is prescribed for all-rail and water-rail rates from north Atlantic points to points in North Carolina and fifth class rates are prescribed from Savannah and Port Wentworth, Ga., for less than carload traffic.

The carriers had proposed a general readjustment in which the rates were largely made 26 per cent of the first-class rates they had proposed in the class-rate investigation and various state commissions and shippers' organizations had proposed other bases, one of which was the Georgia intrastate scale. In the discussion of the level of the rates Commissioner Eastman quotes from an earlier sugar rate decision of the commission in 1918 in which it said: "Sound economic considerations require that the transportation charge (on sugar) shall be as low as is consistent with proper remuneration to the carriers for the service performed." He also quoted from a 1913 decision in which reference was made to the concentration of the sugar traffic "in a few powerful concerns," whose control of its routing "gives them a leverage on controlling the rates" and in which it was stated that "there are grounds for thinking that sugar and similar commodities, such as corn products, are enjoying here and there rates that do not contribute in proper proportion to the revenues of the carriers."

Commissioner Eastman then cites evidence "tending to show that the freight rates on sugar are not of great consequence to the consumer who pays them in the final analysis" and other evidence indicating the possibility of higher rates. Among other rate comparisons made is that with the rates on sugar prescribed in the Consolidated Southwestern Cases on the basis of 30 per cent of the first class rates, and it is stated that Class 8 under the new southern scale will be 30 per cent of first class.

It is also noted that the commission has comparatively recently prescribed rates on sugar from New Orleans to Selma and Montgomery, Ala., approximating 26 per cent of the new first-class rates and from New Orleans to Mobile about 28 per cent.

"Summing up the evidence relating to the rate level," Commissioner Eastman says, "there is much which points to the conclusion that the new class 8 rates are not in excess of maximum reasonable rates on sugar. But it cannot be said that the record fully supports such a conclusion. There is considerable evidence to the contrary, and of particular significance is the fact that the carriers are willing to maintain a generally lower level. A fair distribution of the transportation burden, such as is contemplated by the Hoch-Smith resolution, may at times involve requiring shippers to pay on certain commodities rates materially higher than the carriers are willing to charge, but before such a requirement is made the shippers are at least entitled to more notice and opportunity for opposition than they have had in this proceeding. Our conclusion is that for the future rates should be prescribed on the basis of 27.5 per cent of the new first-class rates. Our best judgment is that such rates will average a little, but not a great deal, higher than the carriers' proposed rates, taking into consideration the average haul, and that they will add somewhat to the carriers' aggregate revenues, particularly if less-than-carload sugar traffic is placed on the classification basis."

"If the interstate rates are made uniformly 27.5 per cent of first class on carloads, subject to a minimum of 40,000 pounds, and fifth class on less than carloads," the report continues, "it is quite obvious that undue preference and prejudice, as well as an unjust discrimination against interstate commerce, will result if the intrastate rates, ratings and minimum weights are not brought into harmony with this uniform interstate structure." No more specific findings are made with respect to the intrastate traffic but it is stated that if harmony of rates is not effected within a reasonable time the matter may be brought to the commission's attention again.

The dissenting opinions are in part as follows:

McMANAMY, Commissioner, dissenting:

I am in accord with the principle that shippers are entitled to notice of, and an opportunity to oppose, any requirement which would compel them to pay rates higher than the carriers are willing to charge, but I can not reconcile this principle and the majority finding because the rates found reasonable, taken as a whole, are not only higher than those proposed by the carriers but are also higher than those now in force and those previously found reasonable by us, 57 I. C. C. 605, 610, and 63 I. C. C. 157.

The basis finally proposed by the carriers, which is 1 cent higher for certain distances than the scale suggested by the examiner, would materially increase the carriers' revenues. The record in this case contains nothing that would justify the still higher level fixed by us, 57 I. C. C. 605, 610, and 63 I. C. C. 157.
WOODLOCK, Commissioner, dissenting:

The principal case here decided is an investigation upon our own motion into the lawfulness of interstate rates on sugar in southeastern territory. Upon an extensive record it is clearly shown (in my opinion) that a general level represented by 30 per cent of first-class rates (i. e. class 8 in the new southeastern class-rate structure) would approximate a maximum reasonable rate level on this commodity in southeastern territory. Nevertheless there are prescribed for the future rates upon a basis represented by 27.5 per cent of first class. This is done because in 1920 and 1921 we prescribed rates from New Orleans to Montgomery and Selma on a basis equal to about 26 per cent and to Mobile on a basis equal to about 28 per cent of first class, and because in the instant case the carriers themselves proposed a level lower than 30 per cent of first class. I am unable to see the relevance of either of these facts to the present case. Of what weight or importance are scattered rates prescribed by us several years ago when we have found it necessary to open an investigation into the entire structure in the Southeast? And in such an investigation, of what weight or importance are rate proposals of carriers which obviously do not represent an opinion by their proposers that the rates they suggest are reasonable maxima?

I am authorized to state COMMISSIONER TAYLOR'S concurrence in this expression.

COMMISSIONER HALL did not participate in the disposition of this case.



Rock Island 550 Hp., Gas-Electric Locomotive Being Tested in Light Freight Service

Future Power Rail Car Fuels*

Development of fuels by distillation would follow a petroleum shortage—Possibilities inherent in distillate engines and fuels

By E. Wanamaker

Electrical Engineer, Chicago, Rock Island & Pacific, Chicago

ONLY a few years ago many well informed experts predicted that a gasoline famine would occur, at least insofar as economic and reasonable costs were concerned, prior to or by 1927. Naturally the predictions were based on the knowledge then available, but new fields were discovered and in spite of a constantly increasing demand, we today have a plentiful supply at an economic delivered selling price. With all data and information now on hand, we might at this time again predict famine, at least insofar as petroleum from the ground is concerned. It is possible that this anticipated famine would not be due to the fact that there was no petroleum left in the ground, but because the location of such petroleum as was left in the ground would result in high transportation cost, and in turn a high selling cost, at least in some sections.

In order to allay any uneasiness on the part of those who invest in internal combustion engine equipment, especially the railroads for motive power to be used in handling light traffic, etc., it is desirable to outline how a fuel supply might be insured after a fashion. The most natural line of development, and, at the same time the easiest, would be first, to follow the best methods of utilization and conservation of fuel as obtained from the present natural source of supply; next, development of fuels by distillation of oil shales, coal, organic or plant growth, etc.

Probable Demand for Internal

Combustion Engine Fuel

In all probability the demand for automobile fuel will increase, likewise for busses and for trucks. There is an increasing demand for fuel for gasoline, oil, semi-Diesel and Diesel engines used in industrial, agricultural, railway and marine service. Just what or how much the demand will be depends largely on the fuel

economics of the engines as designed by the builders. The demand for air craft fuel will, it seems, increase at a rapid rate. Indeed, more than one authority has forecast an ultimate demand that will be equal to that of the automobile.

Liquid fuels for any purpose other than use in internal combustion engines and ships of war are not an actual necessity, but lubricants for operating all kinds of machinery are essential. Hence the demand for such must be considered in any study relative to rail car fuel. In this connection, it might be well to refer to the ultimate value of lubricating oil reclamation and its probable effect on the fuel supply.

The crank case method of lubricating internal combustion engines, using the oil over and over again causes the oil to be in actual practice a cleanser as well as a lubricant. It is therefore possible, by draining it frequently from the crank case, reclaiming and thus using it over and over again, to keep the engine thoroughly clean as well as thoroughly lubricated and promote long engine life.

Several companies have developed and placed on the market plants for such reclamation, most of them consisting essentially of an automatically controlled distillation, separation and filtration equipment.

It has been demonstrated in the case of some distillate engines that the crank case oil should be changed on a 500-mile basis. However, since the actual runs and terminals do not always check out for such a change, the costs were compiled on a 300-mile basis. Experience with the 500-mile change, however, indicates that the oil itself was as good as ever at that time and when put through the reclamer, removing water, distillate, foreign matter and possibly some light ends of the oil, gave even better service than when new. On the basis of 75 per cent of the original oil reclaimed, the process, it seems, can be repeated over and over again. In other

*Abstract of a paper presented at the transportation meeting of the Society of Automotive Engineers, Chicago, October 25 to 27, 1927.

words, on this short mileage the lubricating value of the oil is never lost.

The indications are that if motorized rail equipment can be built in which the first cost, and the maintenance, fuel and lubrication costs are not too high, practically all of the light railway traffic can be motorized to the ultimate benefit not only of the railways but of the public they serve.

Therefore, in making a study of rail car fuels it becomes necessary first to analyze the equipment or engines which might meet the economic and service requirements.

But little will be said about small engines of 100 hp. or less since there will in all probability be few of them and it is engines or cars of 200 hp. or more to which consideration will be given. It would seem that individual engines may be required of at least 400 hp., dual 800 hp. In other words, the range may be 200 to 800 hp. for light rail traffic, including in this range power for 50-ton single motor cars up to 300-ton trains in local passenger service with schedules of from 25 to 30 miles per hour, industry switchers and locomotives for switching other than heavy classification yards, light local and mixed train service on branch or light traffic lines.

Rail Car Fuels Available

Bearing in mind what the producers are accomplishing in the way of increased distillation efficiency of petroleum and the possibilities of fuel from oil shales, coal, etc., with alcohol as a diluent for heavy oils and possibly more effectively used, there are available today the following liquid fuels for rail car operation:

Gasoline
Kerosene
Light Diesel oils

Fuel oils
Benzol

Distillate
Heavy Diesel oils

This list is readily shortened since benzol is in most cases too expensive; kerosene is but little if any cheaper than gasoline on account of the growing demand for kitchen oil stoves, etc. Fuel oil so far has been successfully burned only in large slow-moving stationary and marine Diesel engines. This leaves available gasoline, distillate, light Diesel and heavy Diesel oil.

The distillate engine is primarily a well designed and well built gasoline engine, with a specially designed carburetor for better atomizing and mixing the fuel; slightly lower compression and minor changes in cylinder head design.

The light Diesel oils are suitable for use in high compression solid injection engines when admitted to each cylinder at a fixed time near the top of the compression stroke by a motor driven pump which delivers it to the atomizing injection valves at a pressure of from 3,000 to 10,000 lb. per sq. in.

Heavy Diesel oil is suitable for use in air injection or true Diesel engines which on account of weight and low crank shaft speeds are hardly yet adapted to rail car service as viewed from the standpoint of an operating railroad man.

The gasoline engines as built today are undergoing some changes, the nature of which depends on the service in which they are to be used. In the automobile field the trend is toward higher compression engines in an endeavor to increase capacity and efficiency and decrease weight and cost of engine. This will probably result in forcing a higher grade of gasoline at a higher cost, especially so since the automobile engine apparently requires a higher volatile fuel in order to provide the flexibility and indifference to temperature changes due to weather and irregular operation, that the automobile driving public seems to demand.

Air craft engines require a light gasoline with no heavy ends in order that they may obtain thermal efficiency and therefore economy in weight of fuel carried rather than economy in cost of fuel.

Liquid Fuel Specifications

Rail car gasoline engines, large busses, trucks, industrial engines, etc., do not require such a high grade gasoline, hence in referring to gasoline fuel and to distillate fuel, we will consider them as those fuels that conform to the following brief specifications:

No. 1 gasoline is suitable for gasoline rail cars and low compression automobile bus, truck and industrial engines. The No. 2 gasoline is suitable for high compression automobile and heavy air craft but not for war or stunt air craft which for the present at least seems to require a still higher grade.

	No. 1	No. 2
Color (Saybolt scale)	16	25
Doctor	Neg.	Neg.
Corrosion test	(Neg. Immersion)	(Neg Evaporation)
Distillation range		
Not less than 5 per cent over at ..	180 deg. F.	167 deg. F.
Not less than 50 per cent over at ..	284 deg. F.	221 deg. F.
Not less than 90 per cent over at ..	392 deg. F.	311 deg. F.
End point not over	437 deg. F.	374 deg. F.
Sulphur—not over	0.10 per cent	0.10 per cent

The specification for distillate quoted has governed the selection of fuel for distillate burning rail cars for some time.

Distillate

1. The distillate shall be free from water or suspended matter.
2. Color is unimportant.
3. Doctor test negative.
4. Viscosity not higher than 34 seconds Saybolt Universal at 100 deg. F.
5. Distillation Range:
Not less than 5 per cent over at 375 deg. F.
20 per cent over at 425 deg. F.
50 per cent over at 450 deg. F.
90 per cent over at 550 deg. F.
End Point over at 600 deg. F.
6. At least 95 per cent shall be recovered after distillation.
7. The residue left in the flask after distillation shall not show an acid reaction.
8. Sulphur shall not be over 0.30 per cent.

Stationary and marine plants of large size necessitate expensive and heavy Diesel engines in order to obtain the utmost in cost economy both by frugality in fuel consumption and by use of fuel at moderate cost, such equipment not being adaptable to rail service.

It seems that rail cars or motorized rail equipment using internal combustion engines, occupy a field intermediate between that of the automobile, bus, truck, etc., and the stationary or marine engine. The distillate fuel and engine according to some recent commercial service tests, seems to give sufficient flexibility under rail car operating conditions, particularly where modern and efficient electric transmissions are used, and at the same time approaches the low cost of the fuels used by stationary and marine engines.

Motorized rail equipment of the capacity mentioned heretofore, requires a comparatively light weight engine, compact, flexible in operation, with speed and design conducive to long life, inexpensive to maintain, able to stand all weather conditions, easy to cool with limited water supply, efficient in fuel consumption and cost also lubrication, and last but not least, with a comparatively low first cost to keep down excessive fixed charges. It is in an endeavor to meet these rather difficult requirements that much work has been done to develop such an engine and fuel supply for it.

Distillate an Economic Fuel

Distillate seems to come from an economic point in the cracking process. In the pressure distillation or cracking process by which gasoline is made from the so-called gas oils, a by-product somewhat similar to the

kerosene obtained from the straight distillation of crude petroleum is developed.

This distillate or pressure distillation kerosene is difficult to crack into gasoline, does not burn on a wick without smoking and when burned in home heating furnaces has a tendency to turn the window curtains somewhat yellow.

It is made in considerable quantities whenever gasoline is cracked from gas oils and it would seem more profitable for the refiner to sell it as distillate at a distillate price rather than attempt to crack it by any known method or process, or refine it to a point where it could be used as a substitute for kerosene for any of the more common uses of that product.

Some recent experience in commercial service indicates that there is an economic co-ordination of the distillate engine and distillate fuel together with suitable lubricating oil reclamation peculiarly fitting rail car service using engines in the capacity range referred to herein. Some of the reasons for this conclusion are:

First, regardless of the initial source of internal combustion engine fuel supply, it is most reasonable to assume that the differential between gasoline and distillate will increase with any increases in gasoline cost. In other words, the differential may easily increase from one, two, three, or four cents as the case may be, to ten cents.

Second, distillate lends itself to safe and easy storage with but little evaporation loss or liability to explosion, as is the case with gasoline. It can, therefore, be easily purchased and handled in tank car lots.

Third, distillate is not nearly so liable to be stolen as is gasoline.

Fourth, it is safer than gasoline when carried on rail cars or motorized rail equipments in any considerable quantity, and economy necessitates carrying several hundred gallons on the larger motor cars.

Fifth, distillate properly carbureted is a smooth burning fuel and where heavy loads are handled for long periods this is a very desirable feature.

Sixth, the first cost, operating and maintenance, cost of distillate engines and fuel, flexibility and their reliability for capacities ranging from 200 to say at this time 500 hp. capacity, all tend to balance out a net economy in rail car service, even now in this flush period of gasoline supply with a promise of offering a better net in the future as compared with gasoline and Diesel engines.

The following figures may offer some suggestions as to what we may look for in the future.

Distillate costs are, considering all factors, now running about four cents under gasoline costs, delivered into rail car tanks for service.

In the case in hand, with distillate at six cents and gasoline at 10 cents a gal., lubricating oil at 50 cents, and a lubricating oil reclaiming plant used, we find that a 90-ton two-car motor train with one 275-hp. engine operating 300 miles per day, 300 days per year, will consume 12 gal. of lubricating oil per 300 miles, consisting of

3 gal. of new oil at \$0.50	\$1.50
9 gal. of reclaimed oil at \$0.10 .....	.90
Total	<u>\$2.40</u>
Average cost per gal. ....	.20
Operating cost using distillate fuel:	
Fuel	3.53 cents per mile
Oil	0.8 cents per mile
Total	4.33 cents per mile
Operating cost using gasoline fuel:	
(15 gal. of lub. oil required for 1,500 miles)	
Fuel	5.9 cents per mile
Oil	0.5 cents per mile
Total	6.4 cents per mile

The saving in favor of distillate and reclaimed oil equals 2.07 cents per mile, or \$1,863 per year. This is a saving of \$465.75 per year for each cent differential in price between distillate and gasoline. In case of a dual power plant the saving is doubled.

Looking ahead to a probable differential of 10 cents per gal., the saving in the case of the single unit 90-ton train would be \$46,575 in 10 years, or more than the cost of the motor car. In the case of the dual unit 180-ton train, the saving would be \$93,000, a great deal more than the cost of the car.

It is such figures as these that are apt to make one look with some favor and an investigatory mind toward distillate engines and distillate fuels insofar, at least, as rail cars are concerned.

Annual Report of Bureau of Safety

THE annual report of the director of the bureau of safety is issued in pamphlet form (five cents a copy) following the annual report of the commission, which was noticed in the *Railway Age* of December 10, page 1162.

The statistics are for the year ending June 30, 1927. The inspection of cars and locomotives, which is a primary duty of the bureau, occupied the time of the men 13,987 days during the year, in addition to which much time had to be spent in court proceedings and special investigations; and 1,141 days were required in the investigation of train accidents. Twenty-four of the inspectors took part at various times in the study of power brakes at Purdue University.

The number of freight cars inspected during the year was 1,381,084, and the cars found defective numbered 2.68 per cent of the total. Of the freight and passenger cars and locomotives inspected, the percentage found defective was 2.63 as compared with 3.17 for the preceding year and 3.41 the year before that, the year 1927 showing the smallest percentage in the last ten years.

The bureau has co-operated with the American Railway Association in standardizing safety appliances for box cars; also in the tests of brake equipment at Purdue, as before noted.

A brief discussion, in this report, of automatic train pipe connectors, was noticed in the *Railway Age* of December 17, page 1210.

Investigation of excessive hours of service by trainmen and telegraphers which is the subject of a separate report each year, continues to show improvements in service. The total number of instances of excess service on the year reported on was 23.5 per cent less than the number reported for the preceding year; but there is need of further improvement as is indicated by the fact that within the year the government has instituted suits against 18 railroads for 121 alleged violations of the law. The number of train accidents investigated during the year was 76; collisions, 51 and derailments, 25. These investigations have been noted in the *Railway Age* from time to time.

The bureau examined during the year plans presented by inventors of 34 safety devices, other than those in the signal department; and of the 34, five were given favorable notice.

The pamphlet gives the usual statistics, by roads, of defects in cars and locomotives found on each road; also of air brake tests on trains departing from and arriving at terminals.

Appended to the report are extracts from the annual report of the commission containing those paragraphs dealing with safety appliances, train accidents, etc.

Experienced Engineer Needed on I. C. C.

*Present and future transportation progress discussed at
fiftieth anniversary of Engineers Club of Philadelphia*

CONSIDERABLE attention was given to transportation, and particularly to the railroads, in the celebration of the fiftieth anniversary of the Engineers Club of Philadelphia, December 16 and 17. The general subject of engineering progress and world civilization was covered under three heads. The past in engineering—50 years ago—was discussed on Friday evening, December 16, the present in engineering—1927—on the next afternoon, and the future in engineering—1977—at a dinner on Saturday evening, December 17. A special convocation was held at the University of Pennsylvania on Saturday morning, at which time honorary doctors' degrees were conferred upon Howard Elliott, chairman of the board, Northern Pacific, John Hays Hammond, and Charles M. Schwab.

Addresses of special interest to the railroads were made by Howard Elliott in discussing the present in engineering, and by Samuel Rea, past president of the Pennsylvania Railroad, in discussing the future of engineering.

Howard Elliott's Address

Howard Elliott, after directing attention to the accomplishments of the engineer in various fields, commented on engineering contributions to transportation. The statement that "a broad-gaged and experienced engineer" should be placed upon the Interstate Commerce Commission was well received. Mr. Elliott said in part:

In aviation the year's record of events, to every one of which engineering has directly contributed, is filled with astonishing incidents. There have been so many new records established that it is difficult to keep track of them. We have flown further, we have flown for a longer period of time, we have flown faster, than ever before. The epoch-making flight of Colonel Lindbergh was preceded and followed by other flights, which did not equal his astonishing feat, but were, nevertheless, both daring and important.

Possibly more than any other industry aviation is dependent upon progressive invention by the engineer. The Department of Commerce states that over 90 manufacturers are now engaged in the construction of airplanes. A plane cannot be purchased under 90 days' delivery, and about 6,000 new planes will have been produced in the year 1927. Some idea of the rapid progress in airplane performance can be gained by the fact that in addition to its much greater safety, the speed of the airplane is six times as great as it was in 1913. In 1913 France won the Schneider Cup Race with a speed of 45 miles per hour; in 1920 Italy won it at 107 miles per hour, and in September this year England won it at 282 miles per hour.

We have heard some criticism of late in regard to the lack of progress in transportation by ship. It is pointed out that although our ocean liners are far more luxurious than they ever were before, they fail to keep pace with the demand for speed. From the Atlantic Coast to Berlin requires five and one-half days of travel, whereas twenty years ago it took only twelve hours longer. This

increase is not enough for our modern age. The engineer is being called upon to improve it. New four-day liners are now under construction, which will utilize the scientific results of research and engineering improvements, obtaining greater speed and reducing costs.

During the year the navy launched a new airplane carrier—the Saratoga—which has been called a monument to the progress of modern engineering. The Saratoga's four propeller shafts, each nearly two feet in diameter, will transmit the greatest power per shaft that has ever been projected in a marine installation. The boat can travel 33 knots per hour. It is said that if the Saratoga should steam into Boston harbor and her generators should be connected with the electrical circuits of that metropolis, they would give sufficient electrical power to light the entire city, run the street railway systems and supply all other present needs for electricity. The combined horsepower of the six electrically driven battleships now commissioned in the United States navy is not equal to that of this one carrier. What a marvelous accomplishment of the naval architects and engineers!

I turn last of all to the question of the engineering progress which has been made on the railroads, with which I have been connected since 1880. We in the railroad business are proud of the recent record of railroad transportation. The titanic struggle of the great war created conditions which prevented the maintenance, operation and development of the railroads as efficiently as in times of peace. As a result, the railroads in 1920 were not in good physical condition, and working methods and operations were demoralized. The managers took up bravely the task of rehabilitating the roads, of improving the working conditions and morale of the employees, of getting money to make needed improvements in roadbed, structures and equipment. And it was no small task. But it was done successfully and the engineer was a most important factor in the great work.

Since 1920, approximately \$6,000,000,000 has been spent to make the most perfect railroad transportation machine the world has ever seen; and the country has the best service it has ever had; it has the lowest freight rates since the close of the war, and the relations between the railroads, the public, and the employees are on a better basis of mutual understanding than ever before. That railroad managers take pride in these results is, I think, pardonable. They have been accomplished in the face of the fact that rates and revenues have been regulated strictly by the government. We have not yet attained a fair return on our investment, but each year have approached nearer to it. In 1920 the rate of return on railroad investment was .09 per cent; in 1926 it was 5.13 per cent. The Interstate Commerce Commission sets 5.75 per cent as the fair return,—not enough to attract capital to the extent that will be necessary as population increases.

The improvement in revenue has been achieved chiefly through efficient and economical operation; and here again the engineer is an important and necessary factor.

Much has been accomplished, but much more needs to be done.

The present day engineer, because of his trained mind, his knowledge of costs of construction, his habit of careful thinking and obtaining accurate results, should have a greater part than he has in the work of regulation of the great public service corporations which is now so important a feature of corporate management. A broad gaged and experienced engineer upon the Interstate Commerce Commission would bring to that most powerful body a knowledge and viewpoint of very great value, and to a lesser degree the same is true of the various state commissions.

Address by Samuel Rea

Samuel Rea, after pointing out possible future developments in engineering in various fields, gave considerable attention to the transportation outlook for the next 50 years. His comments in this respect follow:

Briefly, my views are that fifty years from now the railroads will still be performing the bulk of our transportation service, particularly in freight. The movement of all commodities will increase tremendously, due to the decentralization of industry and population as well as the enormous increase in the buying power of the nation. Just how great an increase of freight movement is likely, in mathematical terms, it would be foolish for anyone to attempt even to guess; but it will be very large.

Water Transport

Besides railroads, we will have water transport, highway transport and transport in the air, as at present. With reference to water transport, I can frankly say that I see no future worth speaking of for inland canals or the canalization of rivers not naturally navigable, at least in a country such as ours, and with such waterways only open a part of each year. The expenditure of further money for projects of this character is, to my mind, in the great majority of cases, nearly a one hundred per cent waste, and I do not think the situation will be any different in 1977 from the present. As a matter of fact, the inland canal era in this country ended at least fifty years ago.

Water transport on the seas and in harbors, rivers and lakes naturally navigable may be regarded as one of the permanent institutions of the human race and it will have progressive development in the next fifty years just as it has had in the last fifty. Airplanes will be regularly flying across the ocean, it is true, but steamer traffic, both passenger and freight, will have an immense increase and will play one of the leading parts in uniting the peoples of the globe.

Highway Transport

The development of highway transport by motor vehicle has been the most remarkable feature of the twentieth century, just as the development of rail transport was the controlling factor in human progress during the nineteenth century. The automobile has brought with it an immeasurable amount of good, also much that we cannot yet definitely appraise. Certainly it has made us the most restless and mobile people in history, possessed by what seems almost like an obsession to be continually going to and fro. That feature may perhaps diminish in prominence in the future, if we may judge by our experience on a much smaller scale with the bicycle; but the utilitarian aspects of motor transport are on a long up-grade of which no man yet sees the end.

By 1977, or before, many highway problems will have to be dealt with. This will mean, among other things,

double decking streets, or perhaps even triple decking them, in the cities, with separate levels for pedestrians; one-way roads in rural districts; separation of grades where important highways cross. It is to be hoped also that some methods will be found to deal far more effectively than at present with the really appalling problem of recklessness in the use of motor cars by inexperienced or incompetent drivers.

The Railroads and Motor Vehicles

In their relations to railroads, the most important function of motor vehicles will doubtless be to act as collectors and distributors at terminals, inter-terminal hauls being more efficiently performed by rail. Motors will doubtless absorb in the future a greater proportion of the shorter distance passenger traffic than at the present time. In the freight field their economic utility will always be more circumscribed, except for collecting and distributing purposes in terminal zones and for reasonable distances around towns and cities. In the great majority of cases, comparatively long hauls of freight, in any considerable quantity, must in the nature of things be better and more economically performed by rail.

Air Transport

In air transport we may expect the future to bring developments powerfully appealing to the imagination, and practically useful as well. But anyone who expects to see airplanes supplant railroads as the principal means of passenger travel, is in my opinion making a very wild guess. Many factors such, for instance, as the strength of materials, must necessarily always limit the size of airplanes and keep the number of passengers possible to be transported in one machine down to a comparatively small number. Therefore, my expectation is that air transport will evolve a de luxe high-speed passenger service with genuine, but distinctly limited, utility for long distance travel and special requirements, and at necessarily high rates. I do not think it can possibly be a factor of any moment in freight service, though it doubtless will develop a field in express service for light articles, at high charges. In fact a beginning is already being made in this respect.

In so far as the railroads themselves are concerned the progress of the next fifty years seems likely to be more a matter of orderly development than of radical change. This is not surprising in view of the fact that railroads today represent the evolution of a full century of cumulative knowledge and experience. In the way of further improvements and betterments along lines already understood, however, there are almost unlimited possibilities, and the question how far we will be able to go in giving the country better railroads in the next half century is chiefly a question of what the railroads will be allowed to earn.

Electricity vs. Steam

Electrification will be greatly extended, although it is extremely doubtful whether it is at any time destined to supersede steam entirely as the principal motive power. Electricity has great operating advantages under certain conditions, such as in dense traffic, on lines with heavy grades and where frequent stops have to be made, as in commutation passenger service. It lessens terminal congestion by simplifying train movements. It eliminates smoke, which is a matter of importance to cities, and it makes travel cleaner and more comfortable. If the railroads are allowed sufficient earnings they can go very far in fifty years, or even a much shorter period of time, in making it possible for the public to enjoy

those advantages in very large measure. If earning power is unduly restricted, progress will be correspondingly hampered.

The opinion of our best motive power experts is that fifty years hence the steam locomotive will still be with us and doing a considerable part of railroad work; for, contrary to popular opinion, steam has for many purposes operating advantages over electricity which, as far as we can now foretell, it will continue to retain. That the steam locomotive will continue to be improved, there is no question. One of the promising fields appears to be in higher boiler pressures and the more efficient use of fuel. Whether coal in powdered form will prove as successful in locomotives as in steamships and in large power plants is still a matter of experimentation.

Our rail lines themselves are capable of great improvement with respect to elimination of grades and curves and shortening of routes. This of course means more bridges, tunnels, cuts and fills, all of which cost a great deal of money. Other betterments which should be carried far in the next half century include additional double and multiple tracking; the universal use of block signals of, perhaps, improved type; the perfecting and general adoption of train control or cab signal devices, the building of new lines around congested centers to expedite through traffic.

Progress Depends on Earnings

How far the railroads will be able to go in these directions in the next half century depends more upon net earnings than any other factor. In other words, it is a question of allowing the railroads again to earn not merely bare carrying charges on capital, but a substantial surplus over, which can be utilized for the basis of credit, or directly put back into the property as was the general custom with prosperous, well-managed railroads thirty or forty years and more ago.

In conclusion I should like to express the conviction that in 1977 the engineer and the engineering profession will occupy a position of far greater influence and importance in our social and political life than has ever been the case in the past. We are living in a scientific age and the business of the engineer is to apply the progress and discoveries of science to the affairs of every-day existence. If this is a marked characteristic of our civilization today, it will be still more marked fifty years hence, and engineering may well come into its own, with full recognition as constituting perhaps the most important of all occupations by which the human race participates in the shaping of its own destiny.

Western Maryland Reduces Stationery and Printing Costs

THE stationery and printing bill of the Western Maryland has been reduced from an average of \$110,000 per year to an average of \$65,000 per year or one-third, and additional savings have been obtained incident upon reductions in accumulations of stationery at points of use, according to the statement of M. E. Towner, general purchasing agent.

During this survey, a close analysis was made of every item of stationery and printing bought to determine if economies could be made in its purchase or in its handling and use. Approximately 750 different forms used by the railroad were investigated with resultant eliminations and consolidations and the practice was agreed upon that no new forms or changes in forms could be

made without satisfactory explanations. It is considered unnecessary to use highly expensive bond paper for letterheads and only certain of the most important forms, it was decided, required printing on high grade bond papers.

Adopted News Print

News print paper was adopted for all second correspondence sheets in place of railroad manila paper and also for printing all forms of a temporary character such as daily car reports, etc., and for making carbon copies of all waybills in place of printed forms. Number 2 manila paper replaces colored bond papers for temporary forms where a color distinction is necessary, and plain bond is used for all outside letterheads and news prints for inter-departmental work. Forms made up in ink and retained are printed on plain bond in place of expensive or high grade bond papers, while plain ledger paper has been adopted for practically all forms where ledger paper must be used, and the use of medium grade ledger paper has been confined only to the most important forms.

In preparing these forms, printer's ruling has been adopted wherever possible as a substitute for pen ruling, and the use of extra colored lines has been largely eliminated. The practice of furnishing one-half size letterheads and copies has been introduced, long and full size letters have been eliminated wherever possible, and action has been taken to encourage the increased use of the smaller forms.

The quality of ink has been studied with a view to its specific use and powdered ink has been introduced for the work of station agents.

Pencil Bill Cut Half

Expenditures for pencils have been cut in half by eliminating the purchase of cheap and consequently poor grade pencils. A standard pencil of medium quality has been adopted. The four grades now purchased are soft, medium-soft, hard, and medium-hard. Each office has agreed to issue pencils through one person and an arrangement has been made where a record is kept of the persons obtaining pencils with the date and quantity of pencils issued in each case. Those departments which use pencils in large quantities, including the office of the superintendent of transportation, car record offices, general accounting department, etc., are furnished with automatic pencils which are charged to the individuals getting them, after which only leads are furnished the department. Exact records show a great reduction in the cost of pencils resulting from these practices.

In all cases, the department heads are required to make and personally check and sign requisitions for a six months' supply of certain items, including pencils, pens, clips, fasteners, etc., and a general system of follow-up, including semi-annual comparisons of records kept for each department, is maintained to secure care in the preparation of requisitions and to encourage care in handling the supplies received.

The survey made has also resulted in eliminating the practice of furnishing shippers with forms and copies of forms on which to render bills against the road for the materials purchased for its operation and maintenance.

ORANGES to the number of 500,000 boxes, filling 1,250 cars, will be sent out of California for the Christmas market, according to an estimate of the freight department of the Southern Pacific. About 20,000 boxes of oranges have already gone from California to Australia and other points in the Orient.

New Haven Installs Modern Signaling



One of the Automatics

THE New York, New Haven & Hartford recently completed an installation of automatic block color-light signals on 47.4 miles of double track between Derby Junction,

Conn., and Holmes, N. Y. On this territory trains are now operated by signal indication only, whereas the line was operated previously by manual block and train orders, with block stations from 5 to 7.5 miles apart. New automatic signals were installed, not only to increase safety, but as a matter of economy, some of the benefits accruing being an increase in track capacity and a reduction of the running time of through freight trains.

Most of passenger service has been abandoned on this line on account of the excellent highway coach service, part of which is operated by the New England Transportation Company, a subsidiary of the N. Y., N. H. & H. However, the freight traffic has been increasing rapidly in recent years on this line, which forms a part of the through fast freight route between New England cities and Poughkeepsie, N. Y., and Campbell Hall, which are interchange points for western traffic. The traffic includes a milk train and about 18 through freight trains each way daily and also a local freight each way except Sunday.

Starting west from Shelton, near Derby Junction, an ascending grade of about 1.1 per cent extends for seven miles, and although this is the ruling grade for the section, the remainder of the line recently signaled traverses a rough hilly country with numerous curves and grades. The signals are so located as to be seen at the greatest possible range. As the tangents are short, prism lenses are used to spread the light over the curves.

The signals are the General Railway Signal Company's Type-D, with 10-volt, 40-watt single filament, bayonet based lamps, using the doublet lens combination with 8-in. cover glasses. The signal heads are mounted on 5-in. pipe poles 11 ft. high so as to bring the lower lens 11 ft. 8 in. above the level of the top of the rail.

A-C. Floating Power Supply

The a-c. floating power supply system is used for this signal installation. Two No. 6 B. & S. hard-drawn copper wires with weatherproof covering are placed on two pins on the track side of the lower crossarm of the existing telegraph pole line. This circuit carries 465 volts a-c., the 47.4-mile installation being cut up into seven feed sections, with the longest feed 14 miles. The Western Union permits a maximum of 1,600 watts to be carried on this pole line. On all but one of these feeds the power factor was corrected to approach unity by connecting capacitors across the line. At each signal location an air-cooled General Electric transformer is

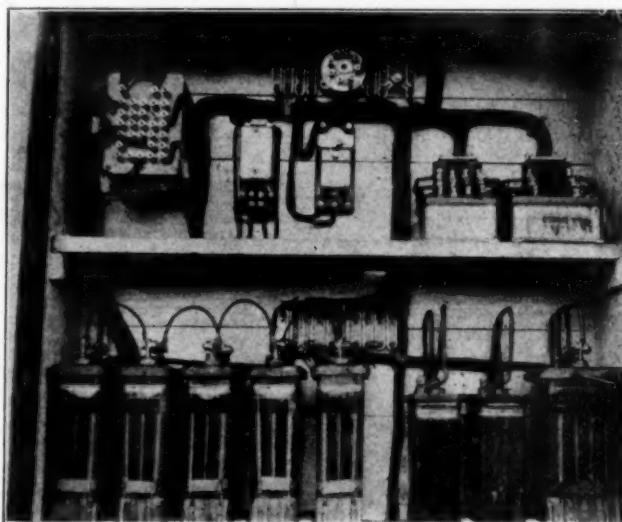
Trains operated by automatic signal indication, superseding manual block and train orders

used to reduce the voltage from 465 to 110 volts. One Balkite rectifier is used to charge the 60-a.h. storage cell for the track circuit and another rectifier cell charges the five-cell, 40-a.h. set of storage batteries used for the control circuits and as a standby for the signal lights in case the a-c. supply is cut off. All storage batteries are Exide chloride accumulator sealed-in type with Manchester positive and box negative plates.

The relays, low-voltage transformer, rectifier cells, and storage battery are located in a wooden box on the field side of the signal. The concrete signal foundation is extended on the field side and two short sections of old rails are placed on the foundation to support the box. These boxes are made from first-class lumber, the top being covered with No. 28 gauge galvanized sheet iron.

This installation includes 69 signals, counting both the interlocked and automatic signals and 131 track circuits. Forty-watt bulbs are used in the interlocked signals as well as the automatics, the interlocked signals being lighted continuously. The power consumed per month for the entire installation averages 4,646 kw.h. or 67.33 kw.h. per signal, including proportionate track circuits, tower indicators and accessory tower equipment. The energy is purchased from commercial power companies and the cost varies according to the location where it is purchased, the average cost per month per signal for electrical energy being \$2.85. The cost per month for labor for the maintenance and operation of the entire system, exclusive of tower operators, is approximately \$850.

The signals are controlled by polarized track circuits



A Combination Relay and Battery Housing

to give the three indications without line control circuits. The light feed circuit is carried through a slow-release relay to prevent flashing the different lights when changing from one indication to another. Approach lighting

is accomplished by 0.075-ohm series relays in the track circuit feeds.

Track circuits extend from signal to signal except where the length of the block or other local conditions make it desirable to use cut-sections. All blocks of more than 3,500 ft. are equipped with cut-sections, located to give the proper approach lighting distance, this depending somewhat upon the alignment and the view the engineer has when approaching the signal.

This signal installation was carried through two interlockings which were rebuilt and semaphore signals replaced by color-light signals. In order to insure a stop indication before the change of a route (i. e., to check the integrity of the lamps in the red and yellow units of the home and distant signals, respectively), a special electric lock circuit was provided, the circuit including the source of feed for the lamp and the lamp filament itself. The lock was placed on the home signal lever to prevent the latching of the lever in the normal position if the home and distant signal aspects are not properly displayed.

The engineering and construction work on this installation was done by the signal department of the New Haven.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended December 10 amounted to 877,600 cars, a decrease of 114,855 as compared with the corresponding week of last year and a decrease of 131,096 as compared with 1925. Reductions as compared with the corresponding week of last year were reported from all districts and in all commodity classifications. The largest decrease was in coal loading, which was 65,006 cars less than that for the corresponding week last year, while miscellaneous freight also showed a reduction of 27,784 cars. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

WEEK ENDED SATURDAY, DECEMBER 10, 1927.

Districts	1927	1926	1925
Eastern	194,105	219,260	222,609
Allegheny	173,113	203,671	199,174
Pocahontas	46,390	61,447	59,716
Southern	143,598	162,694	166,255
Northwestern	100,682	113,602	117,764
Central Western	142,593	147,331	154,784
Southwestern	77,119	84,450	88,394
Total West. Districts	320,394	345,383	360,942
Total all roads.....	877,600	992,455	1,008,696

Commodities	1927	1926	1925
Grain and grain products.....	44,109	45,673	58,635
Live Stock	31,768	34,144	37,411
Coal	172,427	237,433	191,950
Coke	9,666	11,991	16,317
Forest products.....	56,874	63,563	72,119
Ore	7,880	10,068	12,178
Mdse., L. C. L.....	246,904	253,827	259,834
Miscellaneous	307,972	335,756	360,252
December 10.....	877,600	992,455	1,008,696
December 3.....	*918,237	1,051,210	1,020,839
November 26	840,803	937,844	923,206
November 19	968,103	1,071,707	1,057,923
November 12	974,862	1,106,889	1,049,940
Cumulative total, 50 weeks.....	50,077,882	51,393,662	49,553,353

*Corrected figure.

The freight car surplus for the first week in December was 385,748 cars, including 165,403 coal cars and 174,171 box cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended December 10 totalled 66,811 cars, a decrease from the previous week of 11,312 cars and a decrease of 368 cars from the same week last year.

Commodities	Total for Canada			Cumulative totals to date	
	Dec. 10	Dec. 3	Dec. 11,	1927	1926
Grain and grain products..	15,874	21,527	13,304	489,993	481,926
Live stock	2,860	3,296	3,271	118,202	113,021
Coal	8,492	10,347	9,467	349,643	310,276
Coke	547	401	374	18,047	18,767
Lumber	2,465	2,941	2,814	181,418	177,504
Pulpwood	1,521	1,547	1,498	138,259	121,847
Pulp and paper.....	2,431	2,289	2,278	109,075	116,025
Other forest products.....	3,073	3,540	3,061	149,822	150,789
Ore	1,657	1,587	1,660	83,988	86,154
Merchandise, L. C. L.....	16,791	17,554	17,053	844,891	809,462
Miscellaneous	11,100	13,094	12,299	733,775	706,939
Total cars loaded.....	66,811	78,123	67,179	3,217,113	3,092,710
Total cars received from connections	33,767	32,313	37,409	1,825,245	1,834,187



A Reinforced Concrete Girder Bridge Built by the Missouri-Kansas-Texas to Replace an Old Timber Trestle Structure at Pleasant Green, Mo.

The Railroad Problem of Today

*A New York banker's view of Interstate Commerce Commission—
"Is doing much useful and constructive work"*

By F. J. Lisman

DURING the last six months no progress whatsoever has been made in railroad consolidations. Many people blame the Interstate Commerce Commission for this condition; others think if the commission is not in position to authorize consolidation, it should say so freely and not waste time in useless hearings. Such criticism is based on ignorance of all surrounding conditions. The Interstate Commerce Commission is a quasi court which cannot, under the law, refuse to hear applicants. In this particular case the applicants should know as much about the difficulties under which the commission is working as the commissioners do. If the companies persist in thinking their requests should be granted, then the commission must grant them the required hearings.

As the law stands, the commission is in a position to legally grant permission for certain leases, but in doing so it must bear in mind the original intent of the law under which the railroad system of the country was to be reduced to a limited number of systems which, in each territory, should be more or less equal in financial and transportation strength, and which should absorb substantially all the weak lines. At the same time the commission is enjoined to preserve competition. Most of the applicants refuse to take in their proper share of the weak lines and in many cases they do not want to preserve the existing competition. In addition, the commission cannot allow the issuance of securities greater than the physical value of the properties. The theory on which physical values must be based will have to be elucidated by the Supreme Court because there is a wide difference of opinion on this subject within the commission itself, as well as elsewhere. All parties are at a great disadvantage in this matter. The basis on which weak lines must be absorbed is a huge problem by itself because the problem of determining the value of short lines differs practically in each case.

Much has been said by the railroad companies about not earning the standard return on their tentative value as permitted under the law, and the commission has been blamed greatly for the lack of net earnings. The great reduction in rates since 1920 has been much discussed, but probably easily one-third of the reduction in rates has been due to no urging of the commission but has been brought about by voluntary action of the companies in their attempt to placate various traders or shippers and thus get competitive business.

In June I wrote on the Northwestern rate situation as follows:

"The Northwestern railroad companies themselves have been far from doing all they should toward putting their own houses in order and toward getting the maximum net earnings out of the business handled by them. There are a great many commodities moving into the Northwest at abnormally low rates. The commission, in an informal way, has repeatedly suggested to railroad officials that these rates should be analyzed and advanced wherever justified, but the railroad officials do not seem to have the courage to do the needful in that direction. . . ."

This situation is no better now and the same remarks apply to a lesser extent to every section of the country.

Consolidation cannot progress until Congress passes the necessary amendments to the Transportation Act. Chairman Parker of the House Committee on Interstate Commerce introduced a constructive bill for that purpose which may or may not pass the house. It seems to be doubted whether any railroad bill can pass the senate at this time. If no railroad bill passes Congress during the current session, it is unlikely that anything will be done during the short session ending March 4, 1929; therefore no constructive action on the railroad situation may be expected on the part of Congress, until 1930. During the current session, farm relief, flood control and tax reduction appear to be the "burning" issues, although the coming presidential campaign and Congressional election are probably still more important in the minds of the members of Congress.

Some Accomplishments of the Commission

The Interstate Commerce Commission has done and is doing much useful and constructive work for which it receives very little credit—presumably because this is accomplished slowly and with much friction. Among the outstanding accomplishments may be mentioned:

1—*Automatic train control.*—The carriers fought against this just about as hard as they fought against automatic couplers and nearly every other improvement. Today, companies which resisted the order to equip some one division with automatic train control are hastening to install this safety device all over their main lines. Undoubtedly within a few years rear-end collisions on important railroads will no longer be possible. This means not only greater safety for passengers and freight, but a greatly reduced expense in many directions, to an amount perhaps more than sufficient to pay interest and depreciation on the increased investment.

2—*New England Roads.*—There is no doubt whatever but what the Interstate Commerce Commission saved the New England roads from bankruptcy by the timely action of increasing the divisions of these lines. Today those roads are again prosperous and dividend payments on their common stock seem to be within the realm of comparatively early possibilities.

3—*Weak Roads.*—In a similar manner a number of weak roads have been kept alive in order to render service to the adjacent communities. The operations of many roads would have been suspended but for the action of the commission. These remarks apply to the 750 miles of Kansas City, Mexico & Orient, the 350 miles of Missouri & North Arkansas, and several other lines.

4—*Railroad Rate Adjustments.*—The commission is working on, and gradually putting railroad rates on a sound, intelligent and just basis. A new rate structure for the southeast will go into effect January 15. This is based on the cost of service—that is, it takes into consideration the distances each commodity is carried and attempts to allow a proper remuneration in proportion to the cost and not according to the guesses of traffic men of what will get the business, arrived at by a series of bluffs and compromises. The railroad rate structure

as it exists today is the product of traffic departments which have, more or less, tried to get the best of each other. In many cases the localities which have been sufficiently vociferous have been able to overcome their geographical location or disadvantage by sheer insistence, irrespective of distance.

If the distance between "City A" and "City B" were 300 miles and the rates on a given commodity between the two points were 20c per 100 lb., it was possible for some other locality, say "City C" located 100 miles away from "A" to be put on the same basis and to get its commodity carried for 100 miles further at substantially the same rate, merely because they wanted the right to compete and because some particular railroad company was interested in getting the business, even though there might be no profit in handling it. In no other country are such attempts being made to repeal geography in order to conciliate competing interests.

When an attempt is made to adjust rates on an intelligent basis, communities appear at that great "Temple of Selfishness," the Interstate Commerce Commission building, claiming their towns are about to be ruined because some particular freight rate is not satisfactory to some important shipper. The fact is, by putting in proportionate rates, a given community in most cases generally gains as much on one hand as it loses on the other and the rate structure is permanently based on justice instead of on favoritism. If the principle of justice as against favoritism is established, rate cases before the commission will gradually become fewer and fewer; shippers of all communities will learn that they must adjust their business arrangements to geographical location rather than expect to have rates adjusted to their particular desires or preferences. A right step in that direction has been made and, given time, will gradually be extended all over the country. Considering that there are upwards of one million different rates on different commodities between the different localities, this adjustment is a stupendous job. It certainly will not be done perfectly at the beginning—in fact perfection probably will never be reached—but something better will be worked out. If our railroads and shippers will only learn that railroad rates should be based to the fullest extent possible on the cost of doing business rather than be used for the purpose of overcoming wage conditions or local disadvantages, much lost time and energy can be conserved.

5.—Valuation.—During 1927 the Commission finished the stupendous job of valuing the 250,000 miles of railroad with all their appurtenances. In the hue and cry in connection with the differences of opinion about the principles of valuation, the sheer magnitude of this tremendous and meticulously detailed job has been entirely overlooked.

The commission is doing much more constructive work than the public realizes or than the railroad officials generally are willing to admit.

Consolidation Problem

As indicated last June, the matter of whether there are to be four or five trunk line systems which more or less, at present center around the Wheeling & Lake Erie, is in suspense. The trunk lines, no doubt to the great satisfaction of the commission, are now trying to agree among themselves as to what is desirable from the public, as well as their own point of view, but whether they will agree on a plan or do the usual thing,—agree to disagree—remains to be seen. In the meanwhile the matter of the alleged violation of the Clayton Act in the purchase of Wheeling & Lake Erie stock must be thrashed out.

The commission has given no opinion on the application of the Delaware & Hudson to acquire the Buffalo, Rochester & Pittsburgh. It appears to the writer that the commission could hardly be expected to give such a decision when there is only one applicant. If the commission were to give permission to the D. & H. to acquire the B. R. & P. under the terms mentioned and if the owners of the B. R. & P. were to decline to accept the terms, the situation would be worse from the public point of view than it is now because if such a decision were rendered the D. & H. would assert some right of priority to the acquisition of the B. R. & P. to which the commission could hardly consent because the Buffalo, Rochester & Pittsburgh stockholders have the right to sell their property on the best terms possible, subject to the veto power of the commission, based on proper reasoning.

In the Southwestern merger situation the matter of absorbing the weak lines has in no way, shape or manner been faced by the promoters of that system. They have merely declared that they will take in a reasonable number of short lines on proper terms. The commission is compelled to deal with facts and not with theories. The Great Northern-Northern Pacific consolidation case also leaves the weak lines in suspense and some of the state commissions are insisting that the people along the weak lines be assured of permanent and good service. The New York Central's request to lease its controlled lines is in suspense and will undoubtedly remain so for similar reasons.

Considering the falling off in traffic, the railroads have done reasonably well in conserving their net earnings. No doubt here and there they will find methods of saving fractions in operating expenses which, in the aggregate will amount to a substantial sum, but it will be impossible to reduce operating expenses much more if there should be a further decrease in gross earnings.

Problem of Valuation

As most likely nothing will be done about consolidations in 1928, attention will be concentrated on the Supreme Court decision in the St. Louis O'Fallon Railroad Valuation Case.

The decision of the district court in this matter is probably of little importance because it may have been more or less hurried in order to expedite the case to the Supreme Court. If the Supreme Court should squarely decide this case on its merits and not on any technical legal point, then it will pass in principle on the question of whether twelve billion dollars of additional values claimed by the railroad companies, actually exist or not. The extreme range is whether the carriers' properties are worth about twenty-two billions or about thirty-five billions.

If the court should unexpectedly take the carriers' claims at their full value, the result would probably be that the commission would certify that 4½ per cent would be a fair rate of return under present conditions of the money market. The rate structure would then remain substantially the same as it is now. If the commission were to authorize a rate structure sufficient to yield a 5¾ per cent return on the maximum values claimed by the carriers, Congress would promptly legislate it out of office.

Among the interesting cases pending before the commission at present are the following:

(1)—The Chicago, Milwaukee & St. Paul reorganization plan which is likely to be passed on any day, and probably favorably.

(2)—The request of the Piedmont & Northern Rail-

road, an electric line, to parallel about 150 miles of the best part of the Southern Railway's main line, on the theory that being operated by electricity, it is not subject to the commission's jurisdiction, but principally because as usual, the adjacent communities want another railroad although they do not claim to be inadequately served. In fact, one of the attorneys for the applicant said that possibly sometime in the future the existing transportation system might not be managed with proper foresight and that the adjacent communities might therefore be hampered in their development. The case is interesting on account of the great pressure put on the commission by the appearance at the hearing of two state governors and nearly the entire congressional delegation of both houses from the two Carolinas.

(3)—The request of the coal roads leading to Hampton Roads to reduce coal rates to the Great Lake ports in order to match the reduction from the more northerly districts which was authorized by the commission about a year ago. This former reduction was looked upon at the time as an attempt to help the northern districts to pay higher wages in the union labor districts. In other words, rates were supposed to have been adjusted to wage schedules rather than on the basis of cost of transportation.

(4)—A particularly interesting short line case likely to be decided in January is the request of the Ulster & Delaware Railroad to make the New York Central give up to it a substantial percentage of its passenger revenue derived from traffic interchanged between the two lines, in order to enable the weaker carrier to earn a very moderate return on its physical value; that is, about 3 per cent while the stronger carrier is earning above 6 per cent on its alleged value. The examiner for the commission has reported in favor of the short line.

There are a great many other cases pending, the decision on which will gradually elucidate progress towards consolidation and other principles of sound transportation.

Burlington Saves \$5,193 By Purchasing Power at Yard

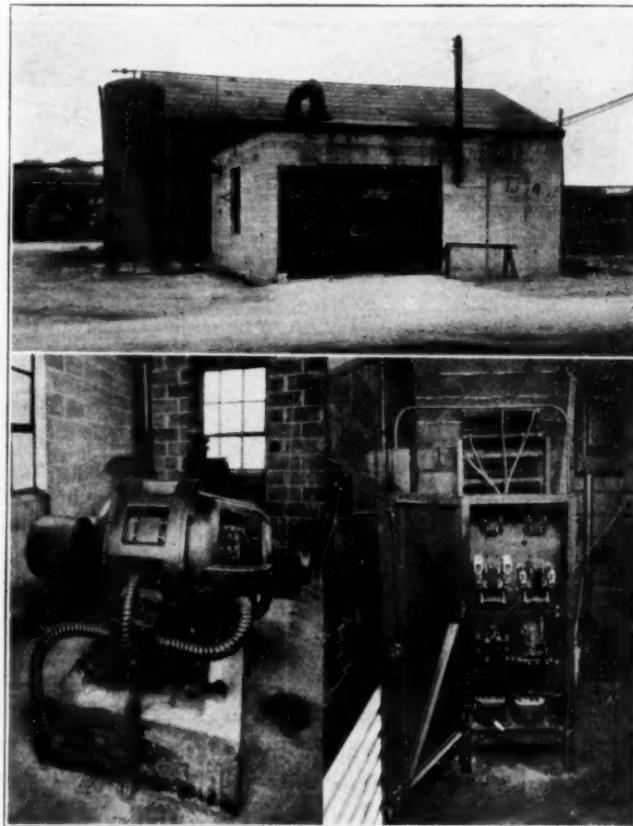
ANET return of 15.8 per cent has been realized on the total expenditure involved in the electrification of miscellaneous terminal facilities of the Chicago, Burlington & Quincy at Murray yard, near North Kansas City, Mo., in the first year since the change to purchased power was made. The annual saving of \$5,193 effected at this yard affords an example of the economic justification of capital expenditures for the purpose of electrifying auxiliary facilities such as the Burlington has done at a number of other points on its system. The electrification of the miscellaneous facilities at Murray yard required a total expenditure of \$32,906 including new investment and retirements. Maintenance, operating and investment charges were included in computing the annual operating costs prior to and after electrification, as given in an accompanying cost statement.

The old power plant at Murray yard furnished steam, compressed air and electric power for roundhouse, repair track and pumping service. Two 80-kw., 440-volt, alternating current generators, steam engine driven, supplied the electrical power demands at the yard. A steam-driven air compressor of 632 cu. ft. per min. capacity furnished the air requirements for repair track and

roundhouse service, a comparatively long pipe line being used to reach the repair track. For fire and boiler washout purposes a steam-driven duplex pump had been used. Two other steam-driven pumps, each in a separate building near the main power plant, formerly de-

OPERATING SAVING EFFECTED BY ELECTRIFICATION OF MURRAY YARD		
(a) Prior to complete electrification:		
Annual operating cost, <i>not including investment charges.</i>	\$20,533.80	
(b) After complete electrification:		
Annual operating costs, <i>including new investment charges.</i>		
maintenance and operation.....	15,340.41	
(3) Annual saving effected since completing electrification of facilities	5,193.39	
(d) Return on money invested:		
Expenditure	\$32,906.00	
Saving	5,193.39	
Return	per cent	15.8

livered untreated water for general use and for the treating plant. The latter was equipped initially with 440-volt motor-driven pumps and machinery and was operated by connection to the plant's electric power service. Similarly the machine shop in the roundhouse



Some Installations at Murray Yard

Top—Concrete Building Which Houses Repair Track Air Compressor. Lower Left—25 Hp. Induction Motor Belt-Connected to Air Compressor Used for Preliminary Air Charging of Freight Trains in the Yard. Lower Right—Special 440-Volt Automatic Control Panel and Pressure Regulator for 75-Hp. Motor Which Drives Repair Track Air Compressor.

was provided with a 15-hp., 440-volt, a-c. motor fed by the old generating plant.

Now the old power plant is employed for heating purposes only, using a low-pressure vacuum return system and the two 80-kw. 440-volt a-c. generators have been retired. All electric power is purchased from the Kansas City Power & Light Company at a primary rate and is metered at an outdoor substation. Power is transformed from 13,200 volts to 440 volts at this sub-

station for distribution throughout the yard. Little change was required in the yard's power distribution system. As no change was made in the type of current or the voltage, no change was necessary in the machine shop or water treating plant, the original motors and control equipment in each case remaining in service after the change-over.

Motor-Driven Equipment

Replaced Steam-Driven Units

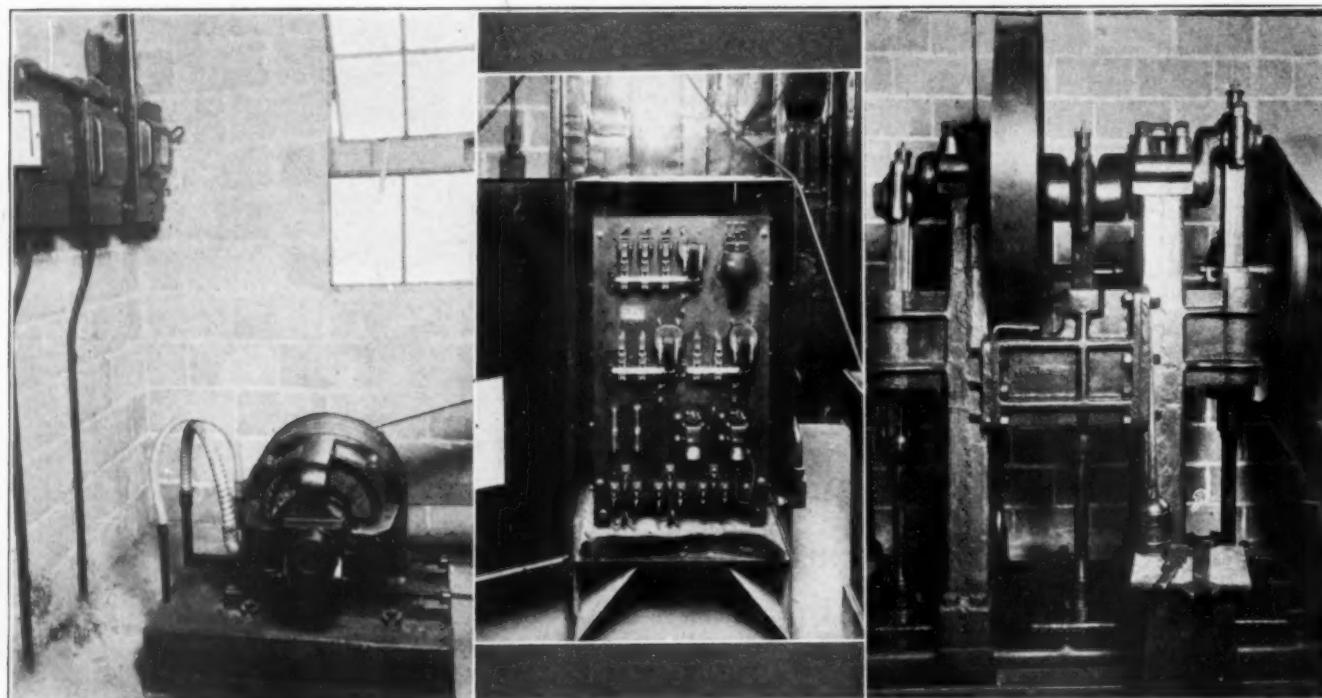
Both the steam-driven compressor and pump in the old power plant were replaced with motor-driven equipment, a 300 cu. ft. per min. air compressor, belt-driven by a 50-hp. induction motor, now being used to supply roundhouse needs. Two motor-driven centrifugal pumps, one for fire purposes and the other for boiler washout purposes, direct-connected to 75-hp. and 30-hp. induction motors replaced the duplex steam pump. In addition it was necessary to install a vacuum pump for the steam heat return line, a 1½-hp. motor being used. All of this new equipment is mounted in the engine room of the power plant building, all control panels and safety switches being mounted in a group

compressor is belt-connected to a 75-hp. induction motor of special design, its most characteristic feature being its high power factor. In this respect this motor approaches the ideal condition of a synchronous motor drive but retains all of the starting advantages of the induction motor.

The air motor which had been used formerly on the turntable was removed and replaced with a 20-hp. induction motor mounted on the same drive assembly as the original air motor. Owing to the limited space available in the turntable control pit, the installation of the motor presented a rather difficult problem. The motor is controlled by a drum-type reversing controller with resistance coils mounted in the rear. The service wires to the turntable are carried into a 100-amp. outdoor-type safety switch mounted on a nearby pole and then up overhead to the collector box mounted above the center of the turntable.

Motor-Driven Yard Air Compressors Provided

Purchased power at the North Kansas City terminal made it possible to provide an air compressor for pre-charging the train lines on freight trains made up in



Left—10-Hp. Motor Which Drives One of the Triplex Deep Well Pumps. Center—Automatic Starting Panel for Pump Motor. Right—Triplex Deep Well Pump Which Delivers "Raw" Water to Treating Plant

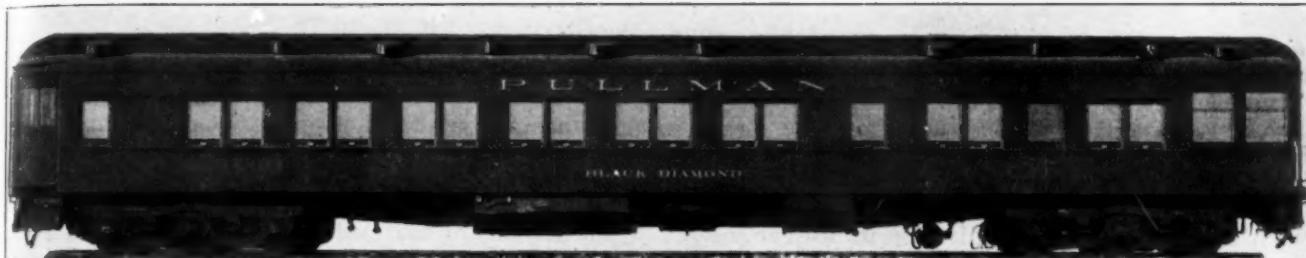
on an angle-iron frame near the wall to facilitate inspection and operation.

When the terminal was electrified with purchased power, the two steam pumps for general water service were replaced by two triplex deep-well pumps belt-connected to 10-hp. induction motors. Both pumps, together with motors and control equipment, are housed in a concrete block building.

Compressed Air Supply

Compressed air for the repair tracks had been furnished by an air line from the power house but this is now taken care of by a separate motor-driven air compressor of 487 cu. ft. per min. capacity, installed in a concrete building adjoining the repair tracks. This

the yard. This yard compressor, which is automatically controlled by a pressure governor, eliminates terminal delays that would be incurred by road freight crews during the course of the regular terminal air brake inspection before departure from the yard. This yard compressor can deliver 150 cu. ft. of air per min. and is belt-driven by a 25-hp. induction motor. Being automatic in operation, the compressor does not have any standby losses and in common with almost all electrical equipment consumes power only when needed and without manual attendance. The pressure regulator or pneumatic switch is adjusted to control the motor within a 15-lb. pressure differential, cutting in at 75 lb. and cutting out at 90 lb. All equipment is housed in a separate concrete building adjoining the departure track.



One of Pullman Observation Sun Room Cars Recently Placed in Service on the Lehigh Valley's "Black Diamond"

Observation Sun Room Cars for the Lehigh Valley

Enclosed rear platform extends utility of observation cars to patrons during the winter months

THE Lehigh Valley recently placed two observation cars in service on the "Black Diamond," daylight trains No. 9 and No. 10 running between New York and Buffalo, N. Y., which are known on the railroad as "observation sun room lounge" cars. These cars, which have been named the Black Diamond and White Diamond respectively, were built by The Pullman Company, Chicago. Each provides seats for 44 persons. Only 24 of these seats, however, are for revenue passengers, the seats in the lounge and sun rooms being provided for the use of all parlor car patrons.

Referring to the floor plan drawing, the cars have a length over the end sills of 77 ft. 9½ in., with 59 ft. between truck centers. The end sills on the observation or sun room platform, however, is 10 ft. 9½ in. back of the center of the rear trucks while the end sill on the vestibule end of the car is only 8 ft. from the center of the front truck.

General Interior Arrangement

Approximately 47 ft. of the front end of the car is occupied by the parlor section, the women's laboratory, hallway and lockers occupying 5 ft. 10 in. of this space at the entrance. The flooring of both the hallway and women's toilet is covered with rubber floor tiling. The women's laboratory, as well as the men's, is finished in solid light green colors, suitably decorated. The interior decoration of the parlor section is of modified Adam motif, the walls being finished in walnut up to the lower side deck, and ornamented in green, gold and tan colors, which adds a touch of Spanish influence. Above the lower side deck the finish is buff colors, suitably decorated and the ceiling panelling is colored and dec-

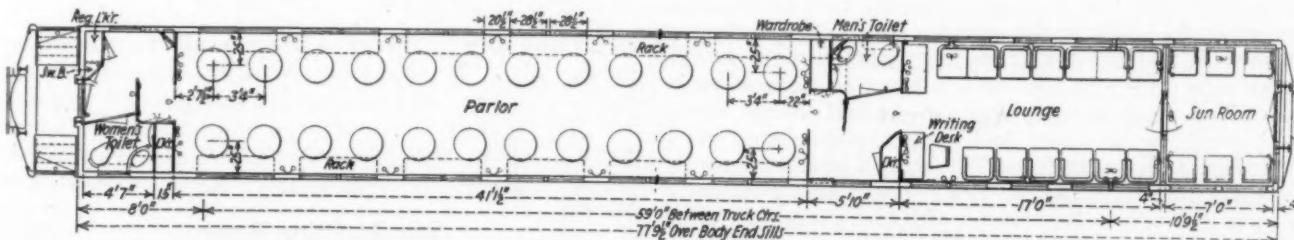
orated to harmonize. The floor is covered with an especially designed carpet which harmonizes with the general interior scheme of decoration. The lighting



A Partition in the Hallway Opposite the Men's Toilet Separates the Lounge From the Parlor Section

fixtures also follow the Adam motif in style, being finished in dull bronze.

The revolving chairs in the parlor section are of a new special design and are covered with a harmonizing



Floor Plan of the Lehigh Valley Observation Sun Room Cars

fabric of green tone. The dimensions of these chairs are of interest as considerable study was made to design a chair which would provide maximum comfort for the patrons. The height of the back from the floor is $36\frac{1}{2}$ in. The height of the seat from the floor at the front is 17 in., at the crown, 19 in. and at the rear, 16 in. The height from the floor to the top of the arms is 20 in. The overall width of the chair is $30\frac{1}{2}$ in. with an inside



Interior of the Lounge Looking Toward the Sun Room

width at the front between the arms of $20\frac{3}{4}$ in. The width inside the arms at the rear is $19\frac{1}{2}$ in. and the depth of the seat from the front to the rear is 19 in., making an overall depth for the chair itself of $33\frac{3}{4}$ in.

The men's lavatory is located between the parlor and lounge sections. In addition, a wardrobe and locker, the location of which is shown in the floor plan, is included in the section occupied by the men's toilet. The partition extending out from the men's toilet between the parlor and lounge sections was applied with a view of dividing these two portions of the car. It also serves to screen the men's toilet from the view of the occupants of the parlor section. Mirrors were applied to the partition to enliven it and to eliminate the bare wall effect.

Each car is provided with two water coolers, one of which is located in the hallway of the vestibule end and the other in the men's toilet. The water cooling system is of the Pullman standard design, the water in the cooler being contained in a brass tube or jacket so that it does not come in contact with the ice. The water is under 20-lb. pressure and as the brass tube is connected direct to the water pressure system, there is no necessity for the porter to watch the water supply to see that it does not become exhausted. The ice compartment is lined with Monel metal and the cooler is provided with a cast brass base to reduce the possibility of injury from ice being dropped on it.

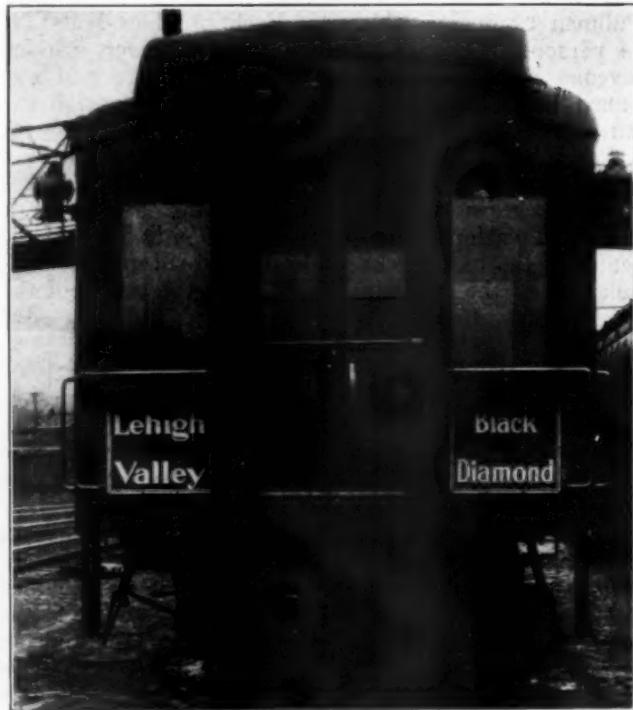
Lounge and Sun Room Sections

The lounge section of the car occupies 17 ft. of the car length and has a seating capacity for 14 persons, including the chair at the writing desk. The walls are finished in walnut similar to the parlor section on the lower side deck and the same scheme of decoration is used above the lower side deck except that ceiling beams are applied on the upper deck ceiling. The furniture is of walnut and is upholstered in figured mohair plush of Venetian pattern. The floor is covered with a specially designed carpet to harmonize with the general interior scheme. The lighting fixtures consist of special side light bracket fixtures which harmonize, as do the desk and table lamps, with the scheme of finish in this room.

The interior of the sun room is finished in solid light green colors and is decorated to harmonize with the lounge section. The ceiling is panelled in buff and the mouldings are decorated in green, gold and tan. The floor is covered with linoleum which has a pattern of large alternate squares of black and terra cotta. The lighting fixtures consist of four double bracket fixtures which are also of the modified Adam motif. Six reed chairs are placed in this room which are finished in a harmonizing light green and are provided with cushions of tan color.

System of Heating and Ventilating

The cars are heated by the Vapor system. Each of the three compartments are heated by individual circuits which can be separately regulated. A regulator is connected direct to the 2-in. steam train line which furnishes steam heat to protect the water tank from freezing and at the same time furnishes hot water for the car. This regulator has no connection to the heating system; therefore, hot water can be obtained when the inlet valves inside of the car are closed. The car is ventilated by 11 Pullman standard exhaust ventilators, one of which is located in the women's toilet, five in the parlor car section, one in the men's toilet, three in the lounge room section and one in the sun room. Two 9-in. exhaust fans are also provided in the lounge section. Each exhaust ventilator has a capacity of about 14,000 cu. ft. of air per hour at a train speed of about 40 m.p.h. Air intakes are provided in the outside sash in the two lava-



Observation Sun Room End of the "Black Diamond"

tories and also in the passageway window opposite the men's toilet. Registers or revolving shutters are provided in the deck sash in front of the ventilators throughout the car with the exception of those in the lounge room. These registers permit varying the exhaust capacity of the ventilators according to weather conditions.

The Lighting System

The electric lighting system consists of a 100-ampere, 30-volt generator suspended from the body of the car

with a pulley on the center line of the car, and Gould 315-amp. hr. batteries.

As stated in a preceding paragraph, the electric fixtures in the parlor section are of Adam period design with "Ivrene" shades and 25 watt, inside frosted lamps. They are located on the side wall of the car only. The light fixtures in the lounge section are also located on the side walls but are of Spanish design without shades and have 25-watt flame-type frosted lamps. The table lamp is also of Spanish design with a mica shade and is placed on the portable table in the lounge. A combination desk lamp and ink stand of the same design is placed on the writing desk in this section. The sun room fixtures, located on the side walls, are decorated with mica shades and are also equipped with 25-watt lamps.

The electric fans consist of a total of four 12-in. blow fans located in the parlor section of the car, two at each

end, and two fans of the same type in the lounge, one being located at each side of the bulkhead opening at the forward end of the lounge. These are in addition to the two 9-in. exhaust fans located behind the deck sash at diagonal corners of the lounge. The sun room has one 12-in. blow fan directly over the dividing door leading into the lounge section.

The Underframe

The underframe is the Pullman standard built-up type of fish belly construction. There are only two steel castings in the underframe; namely, the buffer castings which are 4 ft. 2 $\frac{1}{4}$ in. long and 5 ft. 6 $\frac{1}{2}$ in. wide. Each casting weighs 1,060 lb. This casting is in the shape of a tee, the long leg being connected to the fish belly girders. Pressed steel buffer wings are applied on each side of the casting at the end. The buffer mechanism is contained in this casting.

Recent Developments in Cost Accounting*

Does success in other industries indicate applicability to railroads?—Complication of seasonal factors

By Andrew Sangster

Consultant Accountant, New York

COST accounting as an essential aid in business administration is now widely recognized. Its history is marked by rapid progress during recent years, especially in commercial and industrial enterprises. In its early stages it was confined to individual lines of business; many of the larger corporations were developing methods of costing adapted to their own problems and improving them from time to time as cost principles became better understood. Industries engaged in the production of a few lines based on simple processes of manufacture could, of course, determine manufacturing costs without any elaborate cost system. But the comparatively recent advance is to be found in the general field of business. This could not have been attained so rapidly but for the marked change which has occurred in the attitude of many business owners and executives toward the use of cost data.

To what influence or causes can this change be attributed? Business men no doubt conceded that a reliable analysis of current costs is useful as an aid to efficiency in producing and selling activities. They realized that if they knew definitely the cost of their products, the information would be of great value in fixing prices and price policies. The practical question for them to decide was whether the means proposed and the expense involved would be justified. One of the foremost among prominent business men to promote a lively interest in the subject from their own point of view was Edward N. Hurley of Chicago. As vice-chairman of the Federal Trade Commission his progressive views commanded wide attention and greatly aided the

science of costing in which he was especially interested.

Present Attitude of Business Executives

Custom and tradition in business usually prevail in normal times, but conditions were profoundly changed when this country became involved in the Great War. The war situation created a demand for many new lines of production calling for prompt delivery, and the need for cost information arose in an acute form. Producers and manufacturers found that the scarcity of labor raised vexatious questions of labor efficiency relative to increasing rates. They lacked the necessary data which would enable them, not only to measure this factor, but to adjust their prices in accordance with an abnormal rise in the price of essential materials and supplies. Many cases arose in the making of contracts for government supplies where the Federal Trade Commission exercised its authority to require definite information as to costs of production. Waiting six months or more for an inventory to determine the profits was out of the question. When the war and excess profits tax became law, the Treasury Department enlarged the scope of its income tax regulations; this brought into play a more stringent policy on the part of federal revenue agents in their examination of the basis used for pricing inventories.

New difficulties beset manufacturers in the period of depression which came later. Credit conditions became more stringent. Inventories had to be revalued and reduced to minimum volume to meet those conditions. The importance of a high ratio of turnover to the amount invested in inventories came to be more widely appreciated by executives. In all of these events cost accounting played a constructive part; business men recognized that efficient management depended to a great extent on

* An earlier article by the same author on the application of cost accounting to transportation appeared in the *Railway Age* of December 10, page 1157.

the intelligent use of statistics and costs. Against this tide of recognition there still survive a few "hard-boiled" executives who hold that efficiency and economy can be secured through direct contact with department heads and their foremen, but they are to be reckoned in the minority. At the seventh international cost conference held in 1926, the president of a well-known manufacturing concern declared that "the use of costs by executives is universal—any intelligent executive is lost without them." He further stated that "year by year the chief executives who do not understand accounting—who do not understand costs—are disappearing. Five years from now there will be no such animal." That may be an optimistic statement but it serves to illustrate the present attitude toward cost accounting.

Practical Problems Involved in Costing

Having been established now for some time, it is natural to inquire what practical methods the science has developed, and whether there is any essential difference between costing for manufacturing industries and costing for railroads. Costs in the broadest sense of the term may include costs of production, selling and administrative costs, and the margin of profit deemed necessary to maintain the industry. It is in the department of production that cost accounting has experienced its greatest development. Costs by processes, costs by products or classes of products, costs by projects and even by job orders, have been worked out and put into practice; the particular class of costs used in any single plant depends on the line of industry involved. In the departments of distribution and administration, costing is in practice only to a limited extent; accountants are not unanimous as to the practicability of applying cost methods in that direction. Some lines of business can be resolved naturally into a manageable number of projects and the selling activities classed in the same way; but in the rank and file of manufacturing concerns producing a varied line of products, it is found that selling costs are too frequently common to large groups of commodities or even to the entire output.

One of the requisites of a practical cost system is that it must produce the cost data promptly or within a reasonable time. But that is just where the average cost system is liable to fail, particularly the job-order system. In a plant manufacturing many different parts to be assembled into various products the costing of the products requires the employment of a large clerical force; and, of course, the clerical labor is greater still if the costs are analyzed by job orders. By the time that the cost data is completed it is very often of little value as a means of promptly correcting defects in factory performance, so that the tendency on the part of the management is to regard it as largely of historical interest. In well-designed systems the time element may be negligible, but the expense and the labor involved are always factors to be reckoned with. Practical economy in cost accounting is just as important as in other departments of the business.

The benefits of experience in such matters are evident in the growing realization that the function of cost accounting is not limited necessarily to the development of product costs as such, but rather that the cost data should furnish the most practical aid to the management in observing currently the actual performances of the producing departments. The comparison of product costs from time to time shows that the elementary operation costs are inherently variable, and that these variances are related to primary causes or conditions, even although the latter are in certain cases directly associated with the

product. In other words, it is the cost of the individual operation which varies. Attention is therefore being directed anew to fundamentals in production cost problems. In the department of selling it is interesting to note that some accounting officials, who have succeeded in working out a plan of distribution, have expressed the opinion that selling costs should not be applied by a theoretical apportionment among products, but should be analyzed by sales methods or operations. These later developments bring us to a consideration of the present trend in the science of cost accounting.

Manufacturing Cost of Finished Product

Every one familiar with manufacturing costs will appreciate the importance of the inventories. They are important from a financial point of view because of the large investment of capital; and the basis of valuation determines to a large extent the amount of gross and net profits. Inventories are usually divided into three main heads, (a) the raw material, (b) the work in process, and (c) the finished product. The pricing of the raw material is relatively simple; usually the basis is either "cost" or "cost or market whichever is lower." Work in process includes three main elements, (1) material, (2) labor, and (3) factory general costs often termed the "burden." Material and labor costs are determined respectively from the record of material requisitioned for each process or department and from the labor employed on the process or operation. The factory burden is apportioned on some basis deemed most nearly representative of actual conditions. It may be applied to products separately by departments or even by departmental divisions (so called production centers), or it may be applied simply and collectively for all departments, depending on the character of the business. When the processes of manufacture have been completed the total amount of material and labor will be recorded and the full complement of burden applied to the product, the aggregate cost being the manufacturing cost of the finished product.

To develop a cost system which will best meet the needs of a particular industry and provide prompt and accurate data with respect to costs of manufacture calls for a high degree of skill on the part of the cost accountant. It is essentially a practical problem in production. Material and labor costs must be traced and recorded through all the various processes of the factory in the most efficient manner practicable, that is, with the least possible amount of clerical labor. But in almost every instance the method of applying the factory burden presents difficulties. It is partly variable and partly fixed. Supplies, power, water, gas, repairs, and similar costs vary more or less with the volume of production. Many accountants prefer to distribute this class of costs separately, and if the power, repairs, and other services are furnished by special departments, the direct or variable costs of those departments are thus distributed. The distribution of the fixed or invariable part of the factory expenses may be effected in various ways. One method is to divide the total supervision, taxes, insurance, depreciation, etc., into equal monthly proportions and absorb each month's charge over the production of that month; more often, however, and more scientifically, the total fixed expenses are budgeted for the year along with the estimated volume of production and a rate is found at which the fixed burden is to be applied. As already stated, the rate may be found separately for different divisions of the factory, and even in the separate divisions the rates used may be based upon different units of production. The under or over absorbed burden must of course be taken up in the income statement.

Variances in Costs—Standard Cost Methods

With the costing mechanism working smoothly there is a continuous record of the receipt of raw material into stores and of its subsequent movement into the producing departments; the labor expended on the various departmental processes is known; the common expenses of the different departments are distributed to the various operations. The individual product costs are obtained from the aggregate of the costs of the separate operations involved in each case, and the inventory is charged with the value of the product delivered to stores as thus determined. Obviously the product costs obtained in this way will vary; they will vary for a particular operation at a stated time as compared with a like operation at some other time; disregarding price considerations they will vary in proportion to the quantity of material used, to the hours of labor, and to the time use of apparatus of equipment. Pronounced variations occur in the cost of material where the price fluctuates from time to time over a considerable range, as in cases where tin, rubber, cotton and other unstable commodities are used in manufacture. To facilitate costing in plants where such materials are important constituents of the product, the price variations are in some cases eliminated by taking the material into product costs at a fixed or arbitrary price. The principle may even be extended to the quantity of material used, so that the cost of material is based upon an average quantity (found from experience) at a fixed or uniform price. The practical question then suggests itself—why not make this principle universal by taking products into inventories on the basis of standard specifications of material, labor, and expense, based on average experience under normal conditions, prices being adjusted from time to time as they move to new average levels?

Standard cost specifications have been used by engineers and superintendents for many years as a basis for judging efficiency in the factory. They have long been used in developing piece work rates for labor, and in checking waste and spoils in the use of material. It is only in a comparatively recent period that cost account-

ants have begun to study standard costs as a basis for valuation of finished products taken into inventories. But it may be said that there is now a marked change of viewpoint in the adoption of this principle by many leading authorities in the profession. It may not permit of universal application, because in some industries producing a varied line of specialties the manufacturing conditions may be such that standard cost methods cannot be made to conform thereto. Nevertheless, in all cases where operations can be more or less standardized there is a field for the development and use of the standard cost method. In actual practice the standard cost specification is an analysis of operations; it therefore furnishes a most effective means of testing efficiency and controlling current or day to day performance in the factory operations.

In this last mentioned respect, practical cost accounting for the industries generally is not essentially different from the methods which have been used for many years by the railroads. Railroad costs are analyzed every month to exhibit and compare average unit costs of service operations; and the desirability of establishing standards of performance is fully recognized. According to the statement of operating officers it is quite practicable to compile standard schedules for most classes of work. But standards of performance in railroad operations differ fundamentally from those of manufacturing plants due to the fact that the former are not fixed but variable, when expressed in terms of quantity of service rendered. This is due to the seasonal variation in the volume of traffic moving over the railroads; hence in practice the comparison of operating results other than by corresponding months or periods one year with another is usually misleading and inaccurate. Consequently it is not feasible to determine representative average unit costs of service operations concurrently with the rendering of the service, in the sense that representative factory costs can be found concurrently with production activities. This subject should be examined carefully in order to understand fully the cost problems of the railroads.



Acme

The "Flying Scotsman" of the London & North Eastern Crossing Scottish Border Bridge at Berwick-on-Tweed

New York State Barge Canal and the Railroads

By R. W. Harbeson

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THE New York State barge canal is interesting not only because it presents important problems in public finance and other problems peculiar to a commercial project built and operated by a governmental body, but also because of its status as a transportation agency and consequently its relation to the railroads. The status of the canal both as a public project and as a transportation agency needs clarifying.

We must begin with the matter of cost. Up to the end of the fiscal year ending June 30, 1926, this project had cost the taxpayers of New York State \$254,099,279. This figure includes cost of construction, permanent improvements, capital charges (interest and sinking funds), maintenance and operating expenses. For the fiscal year ending June 30, 1925 (the last year for which complete figures are available) the net cost of the canal to the taxpayers of the state was \$10,573,626. These figures convey some idea of the huge total investment in the project as well as the heavy annual outlay which it entails. The canal is operated free of toll; whatever revenue the state derives from it is from the use of grain elevators and terminals and from miscellaneous sources.

Used Only Small Part of Capacity

The canal has never floated much over one-tenth of its total tonnage capacity. The traffic moved during the year 1926 amounted to 2,369,367 tons—the heaviest movement in the history of the canal. This amounts to less than 12 per cent of its estimated total capacity of 20,000,000 tons. It is true that the tonnage floated by the canal has been slowly but steadily increasing in recent years. Two facts, however, seem to render any very substantial increases in the future improbable. First, the fact that the canal is ordinarily ice-bound for seven months out of the twelve; second, defects of construction, notably the low clearance under fixed bridges ($15\frac{1}{2}$ feet) which makes necessary the use of specially designed vessels not usable elsewhere. These defects of construction, of which this seems to be the most serious, can be remedied, but only by a large addition to an already enormous investment.

This brings us to a consideration of the vitally important topic of the unit cost of moving freight via the barge canal as compared with the unit cost via railroad. The average cost of moving freight over the barge canal in 1925 was 2.533 cents per ton-mile. The average rail freight charge in the Eastern District was 1.108 cents per ton-mile in the same year. Even if the canal were operated to capacity, the total costs would be at least 1.499 cents per ton-mile.

The "savings" which are alleged to accrue as a result of shipping via the barge canal are calculated by subtracting the average charge made by boatmen for conveyance (0.45 cents per ton-mile in 1925) from the average rail freight charges (1.108 cents per ton-mile in the same year). The effect of this calculation is to ignore completely the capital charges and outlays for maintenance, operation, permanent betterments and claims, which items make up the bulk of the total cost (2.08 cents per ton-mile out of 2.533 cents in 1925). The capital charges are calculated to include not only interest and sinking funds on bonds issued to pay for the project, but also an allowance for interest on the

unfunded capital outlays. This procedure is universal and fundamental in the accounting of private enterprises, and there is no good reason why it should not be applied to government enterprises as well.

The argument seems to be that merely because these funds are supplied by the taxpayers rather than by private investors they should not be included in calculating the cost of shipping goods via the canal. No sound reasons have been advanced so far, however, in support of this argument.

When total costs are considered, as they properly should be, the "savings" due to the barge canal are transformed into huge losses, made good by the taxpayers of New York State to the tune of \$10,500,000 per year. The interests of a small group of canal shippers cannot be identified with those of the people of the state as a whole.

It is alleged that the canal saves the people of New York and adjoining states \$50,000,000 per year in depressed freight rates. The argument would be plausible were there no state and federal regulating commissions. It is, to say the least, doubtful whether these bodies would allow rates in New York to be \$50,000,000 more than at present, in the absence of the canal, and still more doubtful whether they would allow states lacking the "benefit" of canal competition to be overcharged by the railroads in this fashion. The contention is, to say the least, unproved. It must be remembered also that rates paid to the railroads redound not only to private profit (as the demagogues seem to imply), but also to public benefit in the form of taxes. The railroads paid into the treasury of New York State \$20,800,000 in 1923; the barge canal took out, after deducting receipts, \$12,000,000 in the same year.

The canal is over-supplied with terminals. During the years 1924 and 1925 forty-nine out of sixty-six terminals and forty-eight out of fifty-three warehouses handled no canal freight. The total investment in these facilities, plus that in two grain elevators, is \$25,986,728. The superintendent of public works in his 1927 report recommends the sale of fifteen terminals, which cost the taxpayers \$6,917,313.

The two grain elevators owned by the state, at Oswego and Gowanus Bay (Brooklyn), have operated at a heavy loss. This fact is concealed by failing to count interest on the investment as one of the costs. The Oswego plant which cost about \$1,645,000, handled no grain during the past season. These two elevators together represent an outlay of approximately \$4,100,000.

Three motives seem to have been behind the barge canal project. First, the sincere belief on the part of some in the possibilities of inland waterway development. This is simply a case of misplaced zeal. Second, animosity toward the railroads (especially the New York Central) on the part of those of more or less radical turn of mind. These persons supported the project in the hope that it would bring discomfiture to the railroads. The charge made by these persons that the barge canal is unsuccessful because of railroad influence in the state legislature is without foundation. It is a typical case of destructive "reform." Third, a motive appearing after the project had been started was the desire of politicians to curry favor by "getting something" for their constituency in the way of canal outlays. The expenditure on terminals and warehouses seems to reflect this in large part. It appears to be a clear case of "pork barrel" legislation.

Whatever may be the future of the barge canal no difficulty is likely to be experienced in evaluating these facts from its past and present record.

Keeping Superintendents in Touch With Power Conditions

Illinois Central has introduced system of reports to give transportation officers accurate knowledge of locomotive efficiency

BY means of a system of reports made by the mechanical department, each superintendent on the Illinois Central is kept in close touch with the condition of all power assigned to his division. This is in accordance with the plan of the management that each superintendent shall be, in effect, the general manager of his division and, as such, shall have complete information on all factors affecting his operations. Most railways have some means of keeping superintendents advised as to power conditions, but the Illinois Central plan has the advantage of giving considerable detail, including a report on each individual locomotive in such form as to be readily understandable to any one regardless of the extent of his knowledge of mechanical matters.

The present system of detailed reports was inaugurated in December, 1926. Prior to that time, the superintendents were, of course, familiar in a general way with the condition of the locomotives on their divisions, but it required a great deal of time for them to obtain this knowledge and keep it up-to-date, with the inevitable fluctuations that occur in the effective mileage of locomotives, under the stress of heavy seasonal traffic or other conditions apart from normal operation. The report now supplied to the superintendent gives him in concrete, non-technical form not only the general condition of the power, but the condition of each individual locomotive as well.

In many cases, superintendents will assume that the power on their divisions is in satisfactory condition so long as there are no unusual delays due to trains by reason of engine failures, when, as a matter of fact, the power may be in urgent need of shopping. This contingency cannot possibly occur under the present system. In addition, superintendents on the Illinois Central have been forecasting the probable traffic to be handled over their divisions monthly for a number of years, in order to budget their transportation expenses, as described in the *Railway Age* of March 5, 1927, page 648. This forecast, taken in conjunction with the locomotive condition report, enables the superintendent to determine in advance whether his power is sufficient to meet his coming needs. In this manner, no power shortage should occur, as the superintendent knows in advance whether or not his power may be expected to take care of the prospective peak loads and if it is insufficient, the superintendent is made aware of the fact in ample time to take the necessary steps to correct the situation.

While the reports are intended primarily for the superintendent's benefit, they are also of value to the general superintendents in determining power conditions on their districts and to the executive operating officers for the system as a whole.

The Divisional Report

The basic report on which the plan is built is the division report, which is prepared promptly in the master mechanic's office at the close of each month, and submitted to the superintendent, with a copy to the general superintendent.

This report shows the following information:

Engine number, Column 1.
Last shopping (including date, Column 2; class of repairs given Column 3; and expected mileage based on these repairs Column 4).
Miles run out during the month, Column 5.
Miles restored during the month, Column 6.
Total miles run out since last shopping, Column 7.
Mileage remaining as of the last of the month (including the actual effective remaining mileage, Column 8, and its percentage to the total expected mileage, Column 9).

Under "engine number" the number of each individual engine is shown, divided between passenger, freight and yard power, starting with the heaviest power first and continuing to the lightest power.

The Effective Mileage Basis

The figures used for the expected mileage are derived from the generally accepted basis for determining expected effective mileage after repairs, as follows:

EXPECTED MILEAGE

	After Class 1, 2 or 3 Repairs	After Class 4 or 5 Repairs
Passenger	120,000	40,000
Freight	80,000	30,000
Yard and Transfer.....	50,000	20,000

This is, of course, a purely arbitrary basis and is likely to be inaccurate so far as an individual engine is concerned, but, as a whole or even for one class of engines, it reflects the effective mileage with sufficient accuracy for the superintendent's purposes. Also, it has a tendency to balance itself for while some engines will not make their expected mileage before it is necessary to shop them again, others will exceed their expected mileage to offset this.

Under "miles run out during the month" the actual mileage made by each engine during the month is shown. This, taken into consideration with the "miles restored during the month" forms a valuable comparison for the superintendent. It supplies an accurate and effective gage whereby power conditions on the division may be measured each month and the relative increase or decrease in effectiveness of each class of power on the division is revealed at a glance.

In connection with the determination of the mileage restored, it should be understood that a locomotive which is shopped for Class 1, 2 or 3 repairs is presumed to have used up all of its effective mileage. For this reason, after it is turned out of the shop, its restored mileage is given as 120,000, 80,000 or 50,000 miles only, regardless of the few hundred miles that may have been left in the locomotive before it was shopped. The mileage restored by Class 4 or 5 repairs, on the other hand, is presumed to be added mileage. For example, a passenger locomotive which has run out 85,000 miles of its expected effective mileage is taken into the shop for Class 4 or 5 repairs. Having run out 85,000 miles since its last shopping for heavy repairs, this figure is subtracted from 120,000 miles and the locomotive is presumed to have a remaining effective mileage of 35,000 miles. After Class 4 or 5 repairs, the restored mileage is presumed to be 40,000 miles for passenger engines. Therefore, in this instance the total effective mileage of

this engine will be 75,000 miles, or the remaining effective mileage, plus the restored mileage.

The percentage total, Column 9, is arrived at by dividing the result shown in Column 8, miles remaining to be run out, by the result shown in Column 4, expected mileage. The two columns under "mileage remaining to be run out" showing the mileage and the percentage, reflect the existing power conditions on the division in concise, easily understandable form. Totals are given for each class of power, so that the superintendent may know, at any time, what he may expect from his locomotives in any particular service or in all services.

If a locomotive should exceed its expected mileage and still be serviceable, Columns 8 and 9 are left blank for that engine. In case an engine is in the shops during the entire month, Columns 2 to 9, inclusive, are blank, except that a notation is made in Column 4 that the engine is shopped. When a locomotive has made some mileage during the month and is shopped before the close of the month, the mileage run out during the month, Column 5, is shown, all other columns being blank, and a notation is made after the figures in Column 5 to indicate the date on which the engine was shopped. When an engine has been transferred from one division to another, the division to which this locomotive is assigned at the close of the month accounts for the entire mileage made during the month. The division from which the engine is transferred does not show the engine on the report for the month in which the transfer was made.

The Superintendent's Summary

The report prepared by the master mechanic is summarized in the superintendent's office and a statement is prepared giving a comparison of certain factors of locomotive condition, a copy of which is sent to the general superintendent in charge.

This summary gives the following information, consolidated for all locomotives on the division: Engines assigned; miles run out; miles restored; and gain or loss for the month.

Cumulative Gain Or Loss Since January 1, 1926

This information is shown separately for each month since January 1, 1926.

In addition to the information regarding the locomotives on the division as a whole, separate statements are made in exactly the same form, giving the details regarding the locomotives according to the class of service in which they are being used, divided as to heavy passenger, light passenger, heavy freight, light freight and yard and transfer service. This information is also shown separately for each month since January 1, 1926, for each of the five classes.

The summary is completed by a statement showing the percentage of effective mileage remaining, divided as between freight, passenger and yard locomotives, shown separately for each month since January 1, 1927.

The General Superintendent's Report

The information contained in the master mechanic's reports and the superintendent's summaries is consolidated for all the divisions in the district in the general superintendent's office. A summary is prepared that is exactly the same as the superintendent's summaries, except that it gives the condition of all locomotives on the district, divided into the same five classifications, instead of the condition on only one division.

The general superintendent's summary also contains a statement showing the percentage of mileage remaining in engines as of December 31, 1926, as of the last day of the current month and as of the last day of the same

month last year. This is divided into divisions, and gives the total for all locomotives, as well as three statements showing the same information for passenger, freight and yard engines separately. The general superintendent need only glance at this summary to obtain an accurate idea of the condition of any class of power on his district, or, if he wishes, he can determine the locomotive conditions existing on any of the divisions under his jurisdiction.

The System Report

Each month the general superintendent of motive power prepares and submits to the operating executives a statement of locomotive condition, based on mileage run out and restored, covering the entire system.

This report is prepared from information supplied by the master mechanic and contains the following information:

Class of locomotives, Column 1.

Number of locomotives:

Serviceable as of the last of the month, Column 2-A.

Out of service on the last of the month, Column 2-B.

Total assignment, Column 2-C.

Total expected mileage, based on last shopping, Column 3.

Total expected mileage remaining on the last day of the previous month, Column 4.

Total miles restored during the month:

Number of engines, Column 5-A.

Miles restored, Column 5-B.

Per cent miles restored to miles run out during the month, Column 5-C.

Total miles to account for, Column 6.

Total miles run out during the month:

By engines not exceeding expected mileage, Column 7-A.

By engines exceeding expected mileage, Column 7-B.

Total miles run out, Column 7-C.

Miles lost by reason of engines being shopped or retired, Column 8.

Total miles accounted for, Column 9.

Total expected mileage remaining on last day of the month:

Miles, Column 10-A.

Percentage of total expected mileage based on last shopping, Column 10-B.

The figures in Column 6, "total miles to account for" are arrived at by adding Column 4, "total expected mileage remaining on the last day of the previous month," and Column 5-B, "miles restored during the month." The figures in Column 9, "total miles accounted for," represent the sum of Column 7-A, "total miles run out by engines not exceeding expected mileage," and Column 8, "miles lost by reason of engines shopped or retired." The total expected mileage remaining on the last day of the month, Column 10-A, is obtained by deducting the figures in Column 9, "total miles accounted for," from those in Column 6, "total miles to account for."

This information is subdivided as between the various classes of locomotives and the types of service to which they are assigned, and is summarized to show the miles run out, miles restored and gain or loss for passenger, freight and yard locomotives and for all locomotives. This same information is also summarized for the preceding eight months. This statement is supplemented by another giving full details as to each individual engine turned out of the shops during the month, including the engine number, a record of the last shopping for major repairs, subsequent shoppings for repairs, total expected mileage, and miles run out since last light and heavy repairs.

By means of these statements, the operating executives keep in touch with locomotive conditions on the system as a whole in any class of service to which the engine may be assigned, and, like the general superintendents and the superintendents, they have readily available, in easily understandable form, a complete picture of the month's activities of the mechanical department, insofar as they effect operation.

Looking Backward

Fifty Years Ago

To prevent fraud the New York Central has issued an order that all through tickets must be punched after leaving each of four stations between New York and Albany and after leaving each of 18 stations between Albany and Buffalo.—*Railway Review*, December 22, 1877.

The payrolls of the Chicago, Burlington & Quincy for October show that employees in the paint department received an average monthly compensation of \$38.29. In the Aurora locomotive department the average monthly wage was \$49.92, while in the same department at Galesburg it amounted to \$56.14.—*Railway Age*, December 27, 1877.

The Flint & Pere Marquette [now the Pere Marquette] has established a line of steamers across Lake Michigan and constructed a grain elevator at Ludington, Mich., preparatory to shipping grain to Europe via its line and the Grand Trunk. A cargo of flour and pork for Liverpool has just gone forward.—*Railroad Gazette*, December 21, 1877.

The heated struggle over the possession of the Gulf, Colorado & Santa Fe, in which the old board of directors refused to surrender and the new board resigned after starting a suit against them, has virtually been settled. The directors have agreed to the selection of 13 names by the stockholders and the county commissioners from which the board will be elected.—*Railway Age*, December 27, 1877.

Twenty-Five Years Ago

William W. Atterbury at the age of 36 years has been promoted from superintendent of motive power of the Pennsylvania to general manager.—*Railway Age*, December 26, 1902.

The first link in the construction of the San Pedro, Los Angeles & Salt Lake from Los Angeles, Cal., to Salt Lake City, Utah, has been completed with the placing in operation of a railway between Los Angeles and Pomona, 30 miles.—*Railroad Gazette*, December 26, 1902.

During the year ending June 30, 1902, railroads in the United States constructed 6,026 miles of new main line, a figure which has not been exceeded in any one year since 1888. Oklahoma leads the list of 42 states that reported new mileage with track laid on 570 miles of new line.—*Railroad Gazette*, December 26, 1902.

In its sixteenth annual report the Interstate Commerce Commission points out the tendency to combine as the most significant feature of railway development. In view of the rapid disappearance of railway competition and the maintenance of rates established by competition the commission believes that the adequate protection of the public will not be provided until the present Interstate Commerce Act is thoroughly revised. Accident figures compiled by the commission show that during the year ending June 30, 1925, 2.5 collisions and 1.8 derailments occurred per 100 miles of line, while the losses by such accidents, not including claims paid to shippers and passengers, averaged \$3,800 per 100 miles of line.—*Railway Age*, December 26, 1902.

Ten Years Ago

A 17-in. fall of snow on December 17 accompanied by temperatures down to 7 degrees below zero at Louisville, Ky., temporarily paralyzed railroad transportation through the Louisville and Cincinnati gateways. River transportation was completely abandoned.—*Railway Age Gazette*, December 21, 1917.

The first cut in passenger train service of any importance from Chicago west is announced by the Wabash, which on December 30 will take off one of its day trains between Chicago and St. Louis in each direction, where service is considered to be more extensive than necessary.—*Railway Review*, December 22, 1917.

New Books

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railroad Economics, Washington, D. C.)

Books and Pamphlets

The Banana; Its History, Cultivation and Place Among Staple Foods, by Philip Reynolds. A generous part of this book is given to the history of the railways in Central America and steamship lines, their characteristics and special equipment, which have developed because of the increasing demands for bananas. 181 p. Pub. by Houghton, Mifflin, New York and Boston, \$2.10.

The Catalogue of the Centenary Exhibition of the Baltimore and Ohio Railroad 1927, Final Edition. Particularly useful for reference use for those interested in the details of railway history and development from the earliest to the modern features. Illustrated. 210 p. Pub. by Baltimore & Ohio Railroad, Baltimore, Md. 50 cents.

The Claim Agent and His Work; Investigation and Settlement of Claims for Personal Injuries, by Smith R. Brittingham. 463 p. Pub. by Ronald Press, New York \$6.00.

History of the Great Western Railway, by E. T. MacDermot. The first volume of this history, in two parts, covers the years 1833-1863. Illustrated. 902 p. Pub. by Great Western Railway Co., London, England. 21 shillings.

Mundy's Earning Power of Railroads 1927, compiled and edited by Floyd W. Mundy. ".... this book treats chiefly of the earning power of railroads, and deals but little with those features alike most essential to investors" General survey of railroad conditions and statistics for 124 railroads. 568 p. Pub. by Jas. H. Oiphant & Co., New York. Apply.

Periodical Articles

Dull Red Freight Cars. Editorial comment. "The complex life of today depends upon the dull red freight car." Saturday Evening Post, December 17, 1927, p. 20.

Railroads Fail to Earn a "Fair Return" Despite High Per Share Earnings, by Charles W. Foss. Annalist, December 16, 1927, p. 942.

Subjects Suggested for Discussion by the Railway Congress, by D. M. Fábregas. "I. The best section for rails. II. Bearing plates. III. Stability and length of sleepers [i.e. ties]. IV. Some details in connection with metal bridges." Bulletin of the International Railway Congress Association, November, 1927, p. 923-934.

Business in the American Novel, by Charles R. Walker. "When the railroad was arousing literary images of fantastic terror in the thirties and forties, it was of no influence on the fundamental culture of mankind. Today when the network of railroad transportation alters the color and tempo of our thoughts, the Iron Horse as a literary image has faded away." P. 405. Bookman, December, 1927, pp. 401-405.

Refrigeration Service on German Railways, by James T. Scott. Types of cars used and special mention of the fish trains. Commerce Reports, December 12, 1927, pp. 674-675 and 3d cover page.

E. B. FINK, who has just retired from the telegraph service of the Canadian National at Winnipeg, Man., leaves the employ of the road just 60 years after he entered it, he having begun as an operator on the Grand Trunk in 1867 at Lyn, Ontario. Because of ill health he went to California soon thereafter, but returned to the Grand Trunk in 1881, as train dispatcher at Toronto. He went to Winnipeg in 1883. Mr. Fink is now 75 years old; and his father, brother, son and daughter have served in the telegraph department enough to make the combined service of the family in this line 160 years. Mr. Fink has served as dispatcher more than 47 years. On the last day of his service, at WI office, Winnipeg, he handled 246 messages; and he sends with the time-honored key. Officers and employees of the road presented him with a purse of gold.

Odds and Ends of Railroading

People leave railway service to take up many other occupations, but the case of James K. Cook, machinist at the North Springfield, Mo., shops of the St. Louis-San Francisco, is rather unusual. He is leaving railway service to become a missionary. Cook was born in Scotland and during the war he fought with a famous Scottish regiment.

A rather unusual accident occurred at Kennedy, Minn., on December 3, when 50 turkeys roosting on the railway track at night were run over and killed. But the cloud had a silver lining, for all the residents of Kennedy enjoyed a turkey dinner, with trimmings, well in advance of the holiday season and late reports indicate that turkey hash will continue on their tables all this month.

Most roads have something of a problem with regard to their passenger traffic, but this department has heard of one case so bad that it seems to merit special sympathy. An officer of this line asked for a report on conditions said: "Passenger business? Why we haven't any. We can't even get pass holders, our employees, to ride the trains, and even I do most of my traveling in my automobile. I came into the city on the train this morning only because I wanted to read."

Calhoun county promises to lose soon the questionable distinction of being the only county in Illinois without a railway. Agitation in the county for financial support of the proposed Quincy & Alton is expected to culminate soon. The principal reason for Calhoun county being without a railway in a state that is practically covered with tracks, is its location between the Mississippi and the Illinois rivers, requiring the construction of at least one expensive bridge to get rails into the county.

Ignacio Espinosa—Hero

Ignacio Espinosa is an engineman on the Mexican railways. Fired, no doubt, by the stories of railway heroes on other American railways and in Europe, Ignacio determined to show the world that there are Castilian heroes in the railway world, as well. It was fortunate for the city of Cordoba, state of Vera Cruz, that Ignacio came to this conclusion, for otherwise the city might not now exist. At least, its peaceful patios and plazas would be covered with fallen walls, chicken coops and other foreign objects. It came about in this wise. Ignacio was shunting about Cordoba in his switching engine, thinking of nothing except the tortillas Señora Espinosa had promised for supper. Suddenly down the track, his startled eyes beheld a blazing box car. His brain conveyed the even more startling information that the burning car was loaded with dynamite. Then the spirit of Cortez, Balboa, Valezquez and a dozen others seized upon Ignacio. Was he not an Espinosa? Of course. Without blinking an eyelash, according to reliable eye witnesses, Ingacio and his faithful shunting engine bore down upon the burning car, coupled on and started for distant parts. Upon reaching these distant parts, Ignacio uncoupled his engine and went away from there, rapidly. This was a wise move, as it turned out, for not two minutes later the car blew up with an explosion that would have shifted the city of Cordoba into Tampico Bay. Amid shouts of "Viva Espinosa," Ignacio returned to Cordoba to celebrate the occasion in a manner befitting a hero.

Pleasant Words for the Industry

"And yet there are few chapters in the history of America which have more of romance and of thrill to them than that which tells the story of the development of the railroad," says the Chicago Post. "In no country of the world has the evolution of communication by steam been carried on so rapidly or involved more of the spirit of enterprise and adventure. Moreover, the social and political implications of the laying of rails across the plains and rivers, over or through the mountains of this vast land, are of tremendous significance. In the making of an American people, in the unifying of this republic of self-governing states, the railroad has been one of the foremost factors."

Is't Just a Job, or a Position?

(*"Is it just a job—a weary swinging of the shining shovel through the waning, golden afternoon, the long black night?"—Railroad advertisement lauding the company's efficient firemen.*)

Is it just a job—a weary swinging of the shining shovel
Through the waning golden afternoon, the long black night,
While the world's at peace in palace, mansion or in simple hovel
Save when eerie whistles mark the iron steed's wild flight?

Is it just a job to be a fireman on a locomotive—
A darned good job, I think—but then is that know?
Doesn't it inspire as well the soulful advertising writer's votive
And tender tribute fired with ruddy phrase—and how?

GENE MORGAN IN THE CHICAGO NEWS.

They Don't Always Get Away With It

H. E. Gray, charged with perjury, was sentenced to two years in the state penitentiary by a jury in criminal court late Thursday, after it had deliberated 27 hours. Gray was charged, following his testimony in a damage suit tried in the Eleventh district court, in January, 1926. The suit was brought by Mrs. Mabel Arnold against the M.-K.-T. for \$60,000 for injuries received by her son, John Sammon, in an accident at Fayetteville, Tex., on February 12, 1925. Gray testified in the damage suit hearing that a box car door had swung loose from a passing freight train and hit Sammon, knocking him under the moving cars. Other witnesses testified that Sammon ran out to catch the train, fell and was hurt. Before the trial was over, the plaintiff took a non-suit and the case was dropped. It was brought out during the perjury trial that Gray had known one of the attorneys representing Mrs. Arnold for several years and had had a telephone listed under the same number as that used by the attorney.—HOUSTON DISPATCH.

A Santa Fe Safety Letter

Somewhere in the Texas Panhandle
Sometime in September, 1927.

Mr. Barton,
President, Railroad Company:
I ask your American section foreman, Pedro Lopez, who is president of Railroad at Slaton and he say you must be, because you ride in private car and don't look so ignorant like roadmaster or trainmaster, and you not so hard boiled as brakeman.

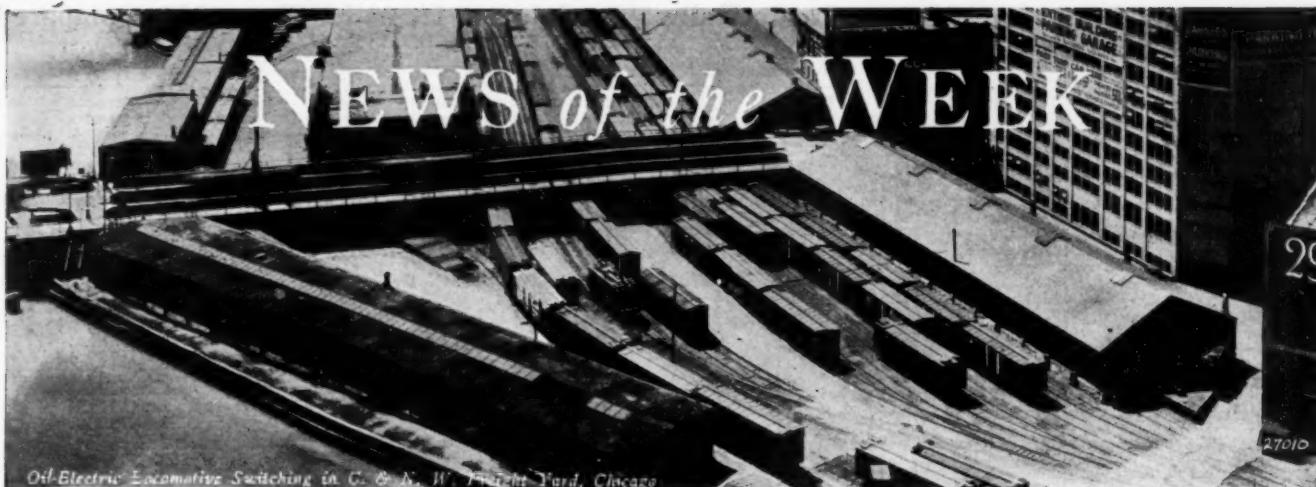
I got complaint to make—your railroad getting too safe. How you expect honest farmer to make living if crops poor and if you keep your cattle gards fixed up and section men drive all cows off track? How I going to get my cows killed and get good price for beef? Your engineers whistle too much at crossings, and we don't have many accidents like last year. Us farmers got to have excitement, your engineers too careful. But you can't stop all our fun, there is still farmers and citizens what will assert their independence and drive in front of train—we show you who runs this country.

My daughter took long ride on train last month, and she say conductors and everybody too polite, and safe, she got no chance to get damages cause she can't get hurt on train. I say it's getting too much. I suppose they keep a doctor at Harvey house now so can't get belly ache there anymore.

My son work at shop at Slaton and he say they gettin' too safe; they didn't anybody get hurt there during August, and they are gettin' so mean about it that a feller can't get a few days off anymore, cause he can't get hurt and he have to ask foreman for vacation—that's hell. My son use to get hurt twice some months when we needed him home, but I guess I going to put old lady to work now. Well must close now as I have to go out and cut fence so cows can get grass on track. If I get cow killed I get good price for meat. If engineer stop, I get to hear him cuss. Lots of fun. I feel bad. Hoping you are the same.

JOH HAYSEED.

P.S.—Your cop, Bull Jones, is getting too smart; he tell my boy to stay off cars.



THE INTERSTATE COMMERCE COMMISSION has granted the New York, New Haven & Hartford Railroad an extension of time from December 31, 1927, to June 30, 1928, for compliance with the order of January 14, 1924, requiring the installation of automatic train control.

THE NUMBER of employees reported to the Interstate Commerce Commission by Class I railways as of the middle of the month of September, 1927, was 1,787,769, a decrease of 0.47 per cent as compared with the returns for August. Owing principally to the fact that September had two fewer working days than August, the total compensation, \$248,894,659, shows a decrease of 3.25 per cent. Compared with the returns for the corresponding month last year, the number of employees reported for September decreased 3.63 per cent, and the total compensation decreased 2.11 per cent.

THE GREAT NORTHERN is planning to establish a "ferry" service for automobiles through the Cascade Tunnel in order to assist in the solution of Washington's east and west highway problem. Upon the completion of the tunnel, a shuttle train service will be installed between Wenatchee, Wash., on the east side of the Cascade mountains and Skykomish on the western side, a distance of 72 miles, solely for the accommodation of automobile traffic. Under the plan, the automobiles will be carried on flat cars, while the passengers will ride in coaches. The night service will be so arranged that tourists retiring for the night on one side of the mountains will not be disturbed until a reasonable rising hour on the other.

Railway Bills in Congress

Senator Trammell, of Florida, has introduced in the Senate a bill, S. 1944, to include refrigerator-car companies within the definition of common carriers in the Interstate commerce act; and Senator Fletcher of Florida has introduced a similar bill as S. 1949. Senator Howell of Nebraska has reintroduced two bills which he proposed at the last session of Congress, S. 1734 to authorize the Interstate Commerce Commission to require competitive bidding for railway securities, and

S. 1735, to limit the commission's rate-making powers to prescribing maximum rates only.

Mechanical Convention Date Changed

Division V, Mechanical, of the American Railway Association, has changed the date of its next annual convention from June 13-20, 1928, to June 20-27, to avoid a conflict with the meeting of the National Electric Light Association.

Commissioner Esch Reappointed

President Coolidge on December 19 nominated John J. Esch for reappointment as a member of the Interstate Commerce Commission for a new term upon the expiration of his present term at the end of the year.

The nomination was referred to the Senate Committee on Interstate Commerce, which discussed it briefly at a meeting on December 20, but, at the request of one or two members, postponed action until after the holidays. A vacancy will therefore exist in the membership of the commission until the Senate has acted on the nomination.

The President did not send to the Senate any nomination of a successor to Commissioner Hall before the Senate recessed for the holidays on December 21. Mr. Hall some time ago expressed to the President his desire to retire from the commission some time during the current year.

A. R. E. A. Nominates Officers

The following members of the American Railway Engineering Association have been nominated for office for the year, beginning at the conclusion of the March convention of that organization:

President: W. C. Faucette, chief engineer, Seaboard Air Line, Savannah, Ga.

Vice-President: G. D. Brooke, general manager, Chesapeake & Ohio, Richmond, Va.

Secretary: E. H. Fritch.

Treasurer: F. J. Stimson, assistant chief engineer, maintenance of way, Western Region, Pennsylvania, Chicago.

Directors (three to be elected): C. W. Baldwin, assistant engineer, Atchison, Topeka & Santa Fe, Chicago; Hadley Baldwin, chief engineer, Cleveland, Cincinnati, Chicago & St. Louis, Cincinnati, Ohio; C. C. Cook, maintenance

engineer, Baltimore & Ohio, Baltimore, Md.; John V. Hanna, chief engineer, Kansas City Terminal, Kansas City, Mo.; C. R. Harding, engineer of standards, Southern Pacific, San Francisco, Cal.; F. E. Morrow, assistant chief engineer, Chicago & Western Indiana, Chicago; J. A. Peabody, signal engineer, Chicago & North Western, Chicago; H. M. Stout, record engineer, Northern Pacific, St. Paul; and A. N. Talbot, professor municipal and sanitary engineering, University of Illinois, Urbana, Ill.

Members of Nominating Committee (five to be elected): R. C. Bardwell, superintendent water service, Chesapeake & Ohio, Richmond, Va.; W. A. Clark, assistant to general manager and chief engineer, Duluth & Iron Range, Duluth, Minn.; F. W. Green, vice-president, St. Louis-Southwestern, St. Louis, Mo.; T. T. Irving, chief engineer, Central Region, Canadian National Railways, Toronto; J. C. Irwin, valuation engineer, Boston & Albany, Boston, Mass.; J. B. Jenkins, valuation engineer, Baltimore & Ohio, Baltimore, Md.; Maro Johnson, assistant engineer, Illinois Central, Chicago; B. H. Mann, consulting signal engineer, Missouri Pacific, St. Louis, Mo.; C. M. McVay, division engineer, New York Central, Charlestown, W. Va.; and H. L. Ripley, corporate and valuation engineer, New York, New Haven & Hartford, Boston, Mass.

A Fly in the Ointment of Government Ownership

The Lower House of the Alaska Territorial Legislature has sent to Congress a memorial asking that a law be enacted by the provisions of which the United States shall consent to be sued in actions founded upon contracts in connection with the government's Alaska Railroad, or for damages arising out of the operation of the railroad in respect to which the party would be entitled to redress if the United States were sueable. It is desired that such a law declare the Alaska Railroad to be a common carrier and subject to all the laws of the United States pertaining to common carriers; that such actions may be prosecuted in the courts of Alaska, and that judgment rendered against the United States may be paid in the same manner as judgments rendered in the United States Court of Claims.

The memorial says that the railroad has been a valuable factor in the development of Alaska and that its traffic is showing a steady increase, but "in the opinion of your memorialists, it is greatly hampered because of the fact that no protection whatever is afforded either the traveling public or the employees of the railroad against the dangers and hazards incident to railroad travel, as the United States has elected, in the operation of the railroad,

(Continued on page 1280)

Operating Statistics of Large Steam Railways—Selected Items for Oct., 1927, Compared

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles		Car-miles		Ton-miles (thousands)		Average number of locomotives on line			
			Principal and helper	Light	Loaded thousands	Per cent loaded	Gross, Excluding locomotive and tender	Net-Revenue and non-revenue	Serv-iceable	Un-serv-iceable	Per cent unserv-iceable	
New England Region:												
Boston & Albany.....	1927	407	210,120	225,403	24,383	5,389	67.8	280,128	108,054	106	15	12.7
	1926	407	244,172	267,080	32,469	5,763	69.7	294,477	117,814	103	17	14.1
Boston & Maine.....	1927	2,075	501,418	582,167	54,524	14,269	70.0	728,526	288,039	272	71	20.7
	1926	2,143	518,192	598,648	53,025	14,880	71.8	752,161	313,520	297	88	22.9
N. Y., New H. & Hartf.....	1927	2,141	590,531	644,448	41,779	17,511	68.4	919,030	377,172	340	51	13.0
	1926	2,162	607,585	639,823	47,216	18,071	70.4	950,624	419,017	316	66	17.3
Great Lakes Region:												
Delaware & Hudson.....	1927	875	365,615	499,657	58,305	11,055	66.2	691,809	346,841	248	33	11.8
	1926	875	402,669	546,960	59,578	12,187	68.0	764,842	395,013	252	36	12.5
Del. Lack. & Western.....	1927	999	603,971	689,281	83,257	19,994	69.9	1,119,502	485,988	241	54	18.2
	1926	999	626,755	726,877	92,008	21,432	71.4	1,199,595	544,404	272	51	15.7
Erie (inc. Chi. & Erie).....	1927	2,317	1,100,890	1,198,963	97,399	44,814	65.0	2,696,829	1,113,044	441	147	25.0
	1926	2,323	1,174,683	1,297,189	154,165	45,651	67.0	2,702,044	1,179,637	546	116	17.5
Lehigh Valley	1927	1,345	631,282	689,943	84,744	19,976	63.8	1,214,868	526,463	354	81	18.6
	1926	1,345	660,803	731,227	86,454	21,610	66.6	1,277,763	587,685	400	78	16.3
Michigan Central	1927	1,820	575,667	593,967	22,081	18,889	61.8	1,077,996	393,429	227	63	21.6
	1926	1,835	609,583	626,552	23,514	19,939	63.6	1,137,630	436,583	242	45	15.7
New York Central.....	1927	6,478	2,058,950	2,304,276	175,620	82,857	62.8	4,969,801	2,092,052	1,081	292	21.3
	1926	6,482	2,252,929	2,565,048	178,492	88,952	63.9	5,352,400	2,340,929	1,140	276	19.5
New York, Chi. & St. L.	1927	1,665	643,246	651,323	8,628	22,567	66.8	1,230,951	465,467	240	50	17.3
	1926	1,665	675,208	680,170	7,385	22,931	70.3	1,204,152	483,371	238	54	18.6
Pere Marquette.....	1927	2,180	475,137	482,760	7,461	12,579	65.2	733,255	320,627	184	40	17.9
	1926	2,179	511,769	522,302	9,202	13,165	66.4	749,679	325,068	189	30	13.6
Pitts. & Lake Erie.....	1927	231	121,441	123,583	1,695	4,454	60.2	358,326	203,887	60	16	21.2
	1926	231	147,667	148,820	1,719	5,533	65.2	422,315	247,133	65	17	20.3
Wabash	1927	2,497	756,202	794,900	14,938	24,464	67.4	1,355,856	539,365	314	52	14.2
	1926	2,497	798,985	833,814	14,177	26,100	71.8	1,409,982	608,549	330	52	13.6
Central Eastern Region:												
Baltimore & Ohio.....	1927	5,540	2,146,653	2,547,911	227,463	65,022	61.3	4,343,078	2,037,810	1,040	218	17.3
	1926	5,519	2,301,399	2,659,601	233,687	68,884	63.9	4,489,965	2,181,562	1,111	169	13.2
Central of New Jersey.....	1927	691	278,758	305,644	50,738	8,303	58.1	551,163	160,631	187	28	13.1
	1926	691	291,884	319,760	35,516	8,871	61.4	579,486	286,321	210	52	19.9
Chicago and Eastern Ill.	1927	945	299,623	303,886	4,405	7,941	63.3	503,435	236,703	103	43	29.4
	1926	945	292,495	293,922	3,583	8,701	64.7	536,236	258,438	127	41	24.3
Clev., Cin., Chi. & St. L.	1927	2,374	784,485	818,136	21,688	25,251	61.0	1,656,505	766,264	334	96	22.3
	1926	2,374	805,791	845,871	24,060	26,495	62.5	1,711,701	816,361	351	86	19.6
Elgin, Joliet & Eastern.....	1927	461	129,184	136,847	6,032	3,787	64.9	285,890	148,687	82	11	11.9
	1926	460	136,442	144,714	5,845	4,110	65.6	310,986	164,938	76	15	16.6
Long Island	1927	396	53,407	58,130	16,203	787	59.4	49,457	19,722	50	12	19.8
	1926	393	50,739	56,284	15,199	777	57.6	49,445	19,470	48	12	20.5
Pennsylvania System.....	1927	10,844	4,633,506	5,121,799	413,656	151,209	63.9	9,850,529	4,511,878	2,892	361	11.1
	1926	10,883	5,324,437	5,823,552	455,220	162,757	65.3	10,739,955	5,208,714	2,822	431	13.2
Reading	1927	1,131	653,464	710,676	69,149	17,893	60.4	1,266,680	640,132	314	79	20.2
	1926	1,129	700,378	769,754	79,235	19,924	64.5	1,369,790	727,417	346	60	14.8
Pocahontas Region:												
Chesapeake & Ohio.....	1927	2,706	1,233,209	1,335,434	55,485	41,484	55.2	3,379,167	1,797,579	543	94	14.8
	1926	2,651	1,349,388	1,431,933	52,579	46,220	57.0	3,754,338	2,067,095	537	104	16.2
Norfolk & Western.....	1927	2,232	864,038	1,064,914	37,127	31,594	60.0	2,550,077	1,360,069	551	47	7.9
	1926	2,231	1,004,953	1,235,743	54,536	37,296	60.8	3,101,908	1,731,931	562	56	9.0
Southern Region:												
Atlantic Coast Line.....	1927	5,098	690,159	694,627	10,975	17,801	63.4	982,107	386,027	447	56	11.2
	1926	4,931	745,332	757,782	12,630	20,218	64.4	1,123,903	456,281	451	39	8.0
Central of Georgia.....	1927	1,898	281,102	282,840	6,732	7,517	71.6	391,028	163,893	143	19	11.5
	1926	1,905	344,039	348,050	7,584	8,694	72.0	470,864	214,639	154	18	10.6
Ill. C. (incl. V. & M. V.)	1927	6,596	2,089,891	2,114,447	47,653	59,640	62.7	3,838,461	1,639,621	789	102	11.5
	1926	6,555	2,140,397	2,154,245	51,349	62,127	65.7	3,872,982	1,725,597	751	106	12.4
Louisville & Nashville.....	1927	5,048	1,828,032	1,906,482	62,112	38,931	58.9	2,710,055	1,295,259	625	105	14.3
	1926	5,021	1,845,776	1,935,124	59,412	38,704	62.5	2,610,918	1,299,387	619	106	14.7
Seaboard Air Line.....	1927	4,282	520,793	538,577	6,873	13,917	66.0	771,594	314,558	237	50	17.5
	1926	3,904	571,321	588,141	8,792	15,294	66.1	870,209	371,415	253	40	13.6
Southern Railway System.....	1927	8,021	1,999,814	2,031,700	33,348	53,243	66.3	2,907,462	1,177,320	1,072	157	12.7
	1926	8,050	2,121,234	2,160,546	40,171	55,199	69.1	2,994,926	1,271,525	1,102	161	12.7
Northwestern Region:												
Chi. & North Western.....	1927	8,470	1,686,727	1,782,645	32,113	45,208	64.1	2,664,839	1,039,141	793	126	13.7
	1926	8,459	1,735,614	1,795,014	25,775	46,782	63.5	2,673,633	1,099,369	758	153	16.8
Chi., Milw. & St. P.	1927	11,202	1,905,742	2,029,946	123,261	59,527	65.9	3,468,839	1,512,647	814	130	13.7
	1926	11,175	1,849,397	1,967,846	112,254	57,092	66.3	3,254,424	1,428,366	845	161	16.0
Chi., St. P., Minn. & Om.	1927	1,724	348,142	378,981	15,776	8,229	70.3	446,700	191,399	167	24	12.4
	1926	1,724	347,716	377,176	16,229	7,531	68.7	404,879	170,514	159	29	15.3
Great Northern.....	1927	8,164	1,313,435	1,355,478	75,940	49,918	62.2	3,216,178	1,459,145	596	80	11.8
	1926	8,182	1,320,663	1,368,344	77,623	49,350	63.0	3,109,505	1,386,996	607	100	14.1
Minn., St. P. & S. Ste. M.	19											

with October, 1926, for Roads with Annual Operating Revenues above \$25,000,000.

Region, road and year	Average number of freight cars on line			Gross ton-miles per train-hour			Net tons per car	Net ton-miles per car-day	Car miles per day	Net ton- miles per car-day	Pounds of coal per 1,000 gross ton-miles	Locomo- tive miles per day
	Home	Foreign	Total	Gross un- ex- clud- ing ser- vice ice- and locomotive train	Gross per train, excluding locomotive train	Net tons per train						
New England Region:												
Boston & Albany.....	1927	2,753	5,725	8,478	2.7	17,773	1,333	514	20.1	411	30.2	8,564
	1926	1,950	5,623	7,573	3.0	14,788	1,206	483	20.4	502	35.2	9,340
Boston & Maine.....	1927	13,135	12,631	25,766	7.3	16,092	1,453	574	20.2	361	25.5	4,478
	1926	11,239	17,896	29,135	7.2	15,113	1,452	605	21.1	347	23.0	4,719
N. Y., New H. & Hartf.	1927	19,000	20,500	39,500	11.7	19,206	1,556	639	21.5	308	20.9	5,684
	1926	19,331	26,462	45,793	18.8	18,447	1,565	690	23.2	295	18.1	6,253
Great Lakes Region:												
Delaware & Hudson.....	1927	8,143	6,277	14,420	4.5	22,814	1,892	949	31.4	776	37.3	12,784
	1926	7,078	7,980	15,058	4.7	22,418	1,899	981	32.4	846	38.4	14,559
Del., Lack. & Western....	1927	15,672	9,813	25,485	4.0	22,324	1,854	805	24.3	615	36.2	15,688
	1926	12,950	11,875	24,825	4.2	22,201	1,914	869	25.4	707	39.0	17,574
Erie (inc. Chi. & Erie)....	1927	31,138	23,074	54,212	4.6	29,788	2,450	1,011	24.8	662	41.0	15,495
	1926	29,710	26,943	56,653	7.6	26,630	2,300	1,004	25.8	672	38.8	16,382
Lehigh Valley	1927	21,592	10,865	32,457	10.3	26,560	1,924	834	26.4	523	31.1	12,623
	1926	19,738	12,807	32,545	7.0	25,146	1,934	889	27.2	583	32.2	14,090
Michigan Central	1927	15,644	14,719	30,363	4.9	27,753	1,873	683	20.8	418	32.5	6,975
	1926	12,622	18,583	31,205	5.0	25,948	1,866	716	21.9	451	32.4	7,675
New York Central.....	1927	61,570	70,711	132,281	4.6	29,702	2,414	1,016	25.2	510	32.2	10,417
	1926	53,796	81,184	134,980	3.3	27,328	2,376	1,039	26.3	559	33.3	11,650
New York, Chi. & St. L.	1927	11,919	12,097	24,016	5.8	26,323	1,914	724	20.6	625	45.4	9,018
	1926	9,409	12,397	21,806	6.3	23,773	1,783	716	21.1	715	48.3	9,365
Pere Marquette.....	1927	8,867	10,249	19,116	4.1	18,496	1,543	675	25.5	541	32.6	4,744
	1926	8,104	12,684	20,788	3.6	16,691	1,465	635	24.7	504	30.8	4,813
Pitts. & Lake Erie.....	1927	12,497	8,311	20,808	3.7	34,407	2,951	1,679	45.8	316	11.5	28,415
	1926	8,478	10,201	18,679	4.1	28,809	2,860	1,674	44.7	427	14.7	34,442
Wabash	1927	14,658	11,797	26,455	2.7	28,640	1,793	713	22.0	658	44.2	6,968
	1926	12,816	15,425	28,241	2.7	25,000	1,765	762	23.3	695	41.5	7,862
Central Eastern Region:												
Baltimore & Ohio.....	1927	70,307	37,038	107,345	5.5	21,215	2,023	949	31.3	612	31.9	11,866
	1926	63,620	44,859	108,479	4.3	19,351	1,951	948	31.7	649	32.1	12,751
Central of New Jersey....	1927	17,828	11,614	29,442	6.1	19,679	1,977	935	31.4	286	15.7	12,169
	1926	14,782	13,466	28,248	5.0	18,185	1,985	981	32.3	327	16.5	13,368
Chicago and Eastern Ill.	1927	12,621	4,678	17,299	30.2	22,862	1,680	790	29.8	441	23.4	8,079
	1926	11,475	5,493	16,968	25.8	23,361	1,833	884	29.7	491	25.6	8,821
Clev., Cin., Chi. & St. L.	1927	17,582	21,922	39,504	4.9	26,911	2,112	977	30.3	626	33.8	10,413
	1926	13,329	22,445	35,774	5.3	26,143	2,124	1,013	30.8	736	38.2	11,092
Elgin, Joliet & Eastern....	1927	8,749	6,946	15,695	5.3	13,798	2,213	1,151	39.3	306	12.0	10,404
	1926	9,163	5,629	14,792	4.6	15,280	2,279	1,209	40.1	360	13.7	11,566
Long Island	1927	1,726	6,517	8,243	1.6	4,968	926	369	25.1	77	5.2	1,607
	1926	1,802	7,654	9,456	0.8	5,049	974	384	25.1	66	4.6	1,597
Pennsylvania System.....	1927	202,587	88,052	290,639	6.6	24,104	2,126	974	29.8	501	26.3	13,422
	1926	191,388	101,788	293,176	7.8	20,544	2,017	978	32.0	573	27.4	15,439
Reading	1927	25,082	13,080	38,162	2.6	21,440	1,938	980	35.8	541	25.0	18,251
	1926	19,035	19,814	38,849	2.8	20,330	1,956	1,039	36.5	604	25.7	20,782
Pocahontas Region:												
Chesapeake & Ohio.....	1927	28,969	15,756	44,725	3.0	30,948	2,740	1,458	43.3	1,297	54.2	21,432
	1926	29,780	13,800	43,580	2.7	28,902	2,782	1,532	44.7	1,530	60.0	25,155
Norfolk & Western.....	1927	28,202	10,033	38,235	1.1	39,158	2,951	1,574	43.0	1,147	44.4	19,660
	1926	30,706	12,993	43,699	1.3	37,497	3,087	1,723	46.4	1,278	45.3	25,038
Southern Region:												
Atlantic Coast Line.....	1927	21,846	8,545	30,391	5.8	18,702	1,423	559	21.7	410	29.8	2,443
	1926	20,097	13,766	33,863	5.3	18,117	1,508	612	22.6	435	29.9	2,985
Central of Georgia.....	1927	4,140	5,790	9,930	2.9	18,839	1,391	583	21.8	532	34.1	2,786
	1926	4,013	7,146	11,159	6.2	18,179	1,369	624	24.7	620	34.9	3,635
Ill. C. (incl. Y. & M. V.)....	1927	38,420	31,487	69,907	6.4	23,736	1,837	785	27.5	757	43.9	8,019
	1926	35,603	34,618	70,221	3.2	22,465	1,809	806	27.8	793	43.5	8,492
Louisville & Nashville....	1927	41,757	22,963	64,720	10.3	17,163	1,482	709	33.3	646	33.0	8,276
	1926	39,473	20,225	59,698	12.7	16,678	1,415	704	33.6	702	33.4	8,348
Seaboard Air Line.....	1927	14,460	8,246	22,706	7.4	18,824	1,482	604	22.6	447	30.0	2,369
	1926	12,213	11,374	23,587	3.0	17,577	1,523	650	24.3	508	31.6	3,069
Southern Railway System....	1927	54,904	28,388	83,292	6.9	19,545	1,454	589	22.1	456	31.1	4,735
	1926	49,927	31,813	81,740	5.2	18,252	1,412	599	23.0	502	31.5	5,095
Northwestern Region:												
Chi. & North Western....	1927	45,830	33,189	79,019	6.3	19,924	1,580	616	23.0	424	28.8	3,958
	1926	45,294	34,473	79,767	6.7	19,324	1,540	633	23.5	445	29.8	4,192
Chi., Milw. & St. P.	1927	52,667	30,123	82,800	5.2	22,837	1,820	794	25.4	589	35.2	4,356
	1926	51,348	29,331	80,679	5.4	21,607	1,760	772	25.0	571	34.4	4,123
Chi., St. P., Minn. & Om.	1927	2,640	10,407	13,047	8.9	16,067	1,283	550	23.3	473	28.9	3,582
	1926	3,068	9,925	12,993	10.8	14,729	1,164	490	22.6	423	27.2	3,191
Great Northern.....	1927	42,060	20,004	62,064	3.6	27,339	2,449	1,111	29.2	758	41.7	5,766
	1926	41,878	21,231	63,109	4.5	27,058	2,355	1,050	28.1	709	40.1	5,468
Minn., St. P. & S. Ste. M.	1927	20,643	9,660	30,303	3.3	18,102	1,521	708	26.2	530	30.4	3,672
	1926	20,058	6,764	26,822	4.1	16,560	1,408	653	24.6	465	26.6	2,850
Northern Pacific.....	1927	36,373	12,655	49,028	5.5	24,491	1,988	899	26.			

News of the Week

(Continued from page 1277)

to avail itself of its sovereign right not to be sued in any matter or action arising out of the operation of the road."

The Holland Tunnel

Inquiries made by the New York Times have brought out the information that the success of this vehicular tunnel between New York and Jersey City, which was opened on November 13, has resulted in a very decided falling off in the movement of automobiles and other vehicles across

the Hudson river on the ferries, and it is stated that the boats of the Pennsylvania have lost 50 per cent of their patronage of this class; the Erie, 40 per cent; the Lackawanna, 33 per cent; the Central of New Jersey, 20 per cent, and the New York Central, 10 per cent. Railroad officers say that the revenue received from these vehicles has produced a material part of the income of these boats and with the loss of this part of the income, the running of the boats for train-passengers alone will have to be done at a loss. The suburban passengers coming from the trains and using these boats do not pay the cost of the service rendered, and it is intimated that some of the boats may have to be taken off.

House Committee Resumes Hearings on Consolidation Bill

Hearings on the Parker bill to provide for voluntary railway consolidations subject to the approval of the Interstate Commerce Commission were resumed on December 19 before the House committee on interstate and foreign commerce, with Commissioner H. C. Hall of the commission as the first witness. The committee has before it the bill introduced by Chairman Parker at the opening of the session as H. R. 5641, in the same form in which it was introduced on March 3 after hearings during the last session, and also a committee print including some amend-

Operating Revenues and Operating Expenses of Class I Steam Railways in the United States

Compiled from the Monthly Reports of Revenues and Expenses for 183 Steam Railways, Including 15 Switching and Terminal Companies

Item	United States		Eastern District		Pocahontas Region		Southern Region		Western District	
			1927		1927		1926		1927	
	Average number of miles operated	238,823.20	238,121.09	59,388.06	59,531.20	5,610.18	5,605.16	39,791.88	39,417.75	134,033.08	133,566.98
Revenues:										
Freight	\$452,607,860	\$472,389,104	\$181,637,319	\$202,086,909	\$21,382,350	\$24,141,567	\$56,618,960	\$59,639,694	\$192,969,231	\$186,520,934
Passenger	a 75,200,862 b 82,166,603	39,327,879	42,338,611	1,482,187	1,720,406	9,362,419	11,175,837	25,028,372	26,931,749	
Mail	7,969,133	8,025,286	3,005,177	3,091,077	205,824	198,251	1,177,124	1,171,381	3,581,008	3,564,577
Express	14,167,974	14,624,131	7,034,530	7,186,934	344,496	313,872	1,637,927	1,787,184	5,151,021	5,336,141
All other transport'n	18,177,685	19,215,821	10,141,653	10,730,809	207,335	262,271	1,125,503	1,273,499	6,703,194	6,949,242
Incidental	11,584,296	13,141,573	5,777,414	6,500,741	327,119	529,783	1,184,884	1,336,992	4,294,879	4,774,057
Joint facility Cr.	1,200,221	1,262,272	469,039	485,526	20,324	8,581	123,058	139,922	587,800	628,243
Joint facility Dr.	409,961	439,941	156,859	148,590	3,271	3,265	36,180	35,141	213,651	252,945
Ry. oper. revenues	580,498,070	610,384,849	247,236,152	272,272,017	23,966,364	27,171,466	71,193,695	76,489,368	238,101,859	234,451,998
Expenses:										
Maintenance of way and structures	76,137,978	79,638,641	32,466,956	34,562,617	3,447,037	3,858,691	10,127,447	11,615,611	30,096,538	29,601,722
Maintenance of equipment	104,656,469	111,733,375	48,341,609	54,878,680	4,602,337	4,883,481	13,858,956	14,547,962	37,853,567	37,423,252
Traffic	9,935,782	9,749,647	3,779,881	3,673,859	251,374	243,782	1,723,288	1,729,548	4,181,239	4,102,458
Transportation	189,654,584	195,898,789	87,627,620	92,497,751	6,177,464	6,764,182	23,987,453	24,971,229	71,862,047	71,665,627
Miscell. operations	4,735,362	4,915,707	2,267,543	2,356,181	79,380	85,830	442,825	495,560	1,945,614	1,978,136
General	16,218,077	15,428,363	7,462,381	6,883,099	540,445	521,791	2,086,962	2,043,646	6,128,289	5,979,827
Transportation for investment Cr.	1,834,594	1,472,371	290,020	233,287	86,276	78,404	143,325	243,663	1,314,973	917,017
Ry. oper. expenses	399,503,658	415,892,151	181,655,970	194,618,900	15,011,761	16,279,353	52,083,606	55,159,893	150,752,321	149,834,005
Net revenue from railway operations	180,994,412	194,492,698	65,580,182	77,653,117	8,954,603	10,892,113	19,110,089	21,329,475	87,349,538	84,617,993
Railway tax accruals	36,534,843	37,439,036	14,247,254	14,894,324	1,931,465	2,078,010	4,774,482	5,089,392	15,581,642	15,377,310
Uncollectible railway revenues	123,504	127,361	29,762	50,300	2,054	3,440	26,089	18,033	65,599	55,588
Ry. oper. income	144,336,065	156,926,301	51,303,166	62,708,493	7,021,084	8,810,663	14,309,518	16,222,050	71,702,297	69,185,095
Equipment rents — Dr. balance	8,421,344	8,505,630	3,023,633	3,612,543	d 625,972	d 443,890	330,887	256,395	5,692,796	5,080,582
Joint facility rent — Dr. balance	2,138,585	2,062,692	1,030,357	1,023,158	106,363	96,317	89,260	120,869	912,605	822,348
Net railway operating income	133,776,136	146,357,979	47,249,176	58,072,792	7,540,693	9,158,236	13,889,371	15,844,786	65,096,896	63,282,165
Ratio of expenses to revenues (per cent)	68.82	68.14	73.47	71.48	62.63	59.91	73.16	72.11	63.31	63.91
FOR TEN MONTHS ENDED WITH OCTOBER, 1927 AND 1926										
Average number of miles operated	238,634.10	237,953.15	59,431.62	59,575.28	5,606.99	5,603.84	39,700.96	39,315.11	133,894.53	133,458.92
Revenues:										
Freight	3,928,003,770	4,002,164,785	1,712,840,441	1,763,745,055	210,340,087	209,417,897	529,935,513	552,307,303	1,474,887,729	1,476,694,530
Passenger	c 823,491,996 e 876,848,320	424,449,710	440,862,887	16,985,792	18,469,708	107,118,198	128,644,893	274,938,296	288,870,832	
Mail	78,090,367	78,478,427	29,717,599	29,852,466	2,026,270	2,040,411	11,598,081	11,792,941	34,748,417	34,792,609
Express	116,757,435	120,772,642	55,456,464	57,419,519	2,682,903	2,651,180	14,889,793	16,005,469	43,728,275	44,696,474
All other transport'n	172,836,002	176,443,660	97,470,540	100,474,809	2,092,467	2,338,108	9,405,613	10,643,943	63,867,382	62,986,800
Incidental	108,976,657	113,480,838	54,200,039	56,245,785	3,811,738	4,392,327	11,534,121	13,346,219	39,430,759	39,496,507
Joint facility Cr.	11,608,124	11,194,674	4,661,380	4,472,578	154,395	140,221	1,603,755	1,416,212	5,188,594	5,165,663
Joint facility Dr.	4,157,364	4,037,420	1,366,115	1,349,035	24,113	23,217	341,207	341,669	2,425,929	2,323,499
Ry. oper. revenues	5,235,606,987	5,375,345,926	2,377,430,058	2,451,724,064	238,069,539	239,426,635	685,743,867	733,815,311	1,934,363,523	1,950,379,916
Expenses:										
Maintenance of way and structures....	738,074,909	734,624,085	307,827,546	311,951,413	32,788,078	32,916,464	100,599,335	107,023,030	296,859,950	282,733,178
Maintenance of equipment	1,029,249,096	1,075,897,550	488,109,173	520,259,716	49,194,850	48,885,785	136,260,315	141,619,545	355,684,758	365,132,504
Traffic	100,363,703	95,034,163	37,304,067	34,891,305	2,630,950	2,487,284	17,359,764	16,938,781	43,068,924	40,716,793
Transportation	1,810,981,415	1,822,460,738	858,882,586	861,404,620	61,757,125	62,203,897	239,381,337	251,906,366	650,960,367	646,945,855
Miscell. operations	47,226,411	47,425,312	21,788,959	21,852,939	833,592	905,861	5,113,762	5,636,512	19,490,098	19,030,000
General	160,413,976	154,072,251	73,147,020	70,450,121	5,596,243	5,096,517	20,937,586	20,160,507	60,733,127	58,365,106
Transportation for investment—Cr.	13,864,487	13,392,984	2,448,363	1,710,998	500,058	518,856	1,211,307	2,469,264	9,704,759	8,693,866
Ry. oper. expenses	3,872,445,025	3,916,121,115	1,784,610,988	1,819,099,116	152,300,780	151,976,952	518,440,792	540,815,477	1,417,092,465	1,404,229,570
Net revenue from railway operations	1,363,161,962	1,459,224,811	592,819,070	532,624,948	85,768,759	87,449,683	167,303,075	192,999,834	517,271,058	546,150,346
Railway tax accruals	324,909,414	329,836,462	134,344,410	136,966,053	18,096,397	17,276,967	42,840,526	45,061,133	129,628,081	130,532,309
Uncollectible railway revenues	1,229,879	1,319,302	471,359	631,612	43,192	32,161	202,595	164,714	512,733	490,815
Ry. oper. income	1,037,022,669	1,128,069,047	458,003,301	495,027,283	67,629,170	70,140,555	124,259,954	147,773,987	387,130,244	415,127,222
Equipment rents — Dr. balance	74,074,444	70,510,321	37,786,199	37,072,888	d 5,041,956	d 5,659,570	4,977,375	9,690,860	36,352,826	29,406,143
Joint facility rent — Dr. balance	20,845,903	19,626,838	10,088,771	8,994,186	992,684	970,516	1,030,119	1,142,210	8,734,329	8,519,926
Net railway operating income	942,102,322	1,037,931,888	410,128,331	448,960,209	71,678,442	74,829,609	118,252,460	136,940,917		

ments considered during the summer and some proposed by the law committee of the Association of Railway Executives.

Mr. Hall said that a bill ought to be passed promptly that will enable the commission and the railroads to "go ahead and function," because the present law needs "limbering up" and that while he could not say for the commission that it favored one form of the bill over another it was his clear impression that any of the proposals would be preferable to the existing law. Asked why a simple bill correcting the defects in the present law would not be sufficient, Mr. Hall said that he would be content with any improvement as compared with the present situation but that it would be idle to pass legislation without conferring upon the railroads the corporate power to do what is authorized, in view of the restrictions in existing state charters and state laws and constitutions in some states. He said the commission has suggested a simple bill "but what we got from the Senate was a most elaborate bill with a lot of provisions relating to recapture." He said that much progress had been made since in the direction of simplification.

Mr. Hall said that, in his opinion, while unification is not a panacea, it should result in more efficient service, with some tendency toward lower costs. He did not look on the subject as a proposal to confer privileges on the railroads but from the standpoint of what can be done to give the country "able-bodied servants." "Some roads are in large systems and some are not," he said, "and cannot compete with the larger systems on equal terms. The problem of regulation would be greatly simplified if we were dealing with a set of carriers each as tall as his neighbor instead of having to devise a set of rates to take care of the women and children as well as the able-bodied men. If the bulk of the traffic of the country could be handled by two-line haul the commission would find it very much easier to adjust rates and police the accounts."

Mr. Hall continued his statement on December 20, making various suggestions for verbal changes in the detail provisions of the bill. The hearing was then adjourned to January 6. The Senate committee on interstate commerce has announced a hearing on the Fess consolidation bill for January 9.

Railroad Arbitrators Absent as Board Grants Wage Increase

Four of the six members of the board of arbitration, which announced on December 5 that it had been unable to reach an agreement on the wage increase demands of the Brotherhood of Locomotive Firemen and Enginemen on western railroads, reconvened at Denver, Colo., on December 17 and the following day announced a decision in which all employees involved in the arbitration were granted an increase.

The two railroad arbitrators, R. V. Fletcher, general solicitor of the Illinois Central, and J. W. Higgins, chairman of the General Managers Association, were not present at the meeting in Denver and

did not participate in the award. They were a party to the decision in which it was found impossible to reach an agreement and declined to serve further on the ground that the board had adjourned.

The award made by the reconvening members on the principal demand for an advance of \$1 per day consisted of an increase of 30 cents in the wages of road passenger firemen and of 35 cents in the wages of all other employees who were a party to this arbitration—road freight firemen, yard firemen, hostlers and hostler helpers. The request of the firemen that the weight on axles equipped with boosters be classed as weight on drivers and be used in determining the various gradations of wages was also granted.

On December 16 the chairman of the Board of Mediation at Washington telegraphed Judge H. P. Burke, chief justice of the Colorado Supreme Court and chairman of the Arbitration Board, that no word had been received from any arbitrator indicating an intention of not serving further in that capacity in the firemen's case. "Based on advice from the department of justice," said the Board of Mediation, "we suggest, on the understanding that all arbitrators have been duly notified, that the meeting called by you for December 17 be held. If all arbitrators are not present there should at least be a majority, who should make an award on the questions presented in the original agreement to arbitrate."

Judge Burke in an additional statement declared: "I originally stated that in my opinion no further regular meetings of this board of arbitrators could be held. But on the opinion of the Department of Justice and the request of the Board of Mediation, I am willing to participate therein, in order that an award might if possible be rendered and filed in the United States District Court which is competent authority to pass on the question."

The two Brotherhood representatives on the board made a statement, in conjunction with the award, in which they expressed the belief that the employees involved are entitled to increases in rates of pay larger than those actually awarded. In spite of this belief they joined in the award in order to give the men the benefit of at least part of the increase to which they believed them entitled.

Paul A. Sinsheimer, a neutral member of the board, in a separate statement concurred in the opinion of the labor arbitrators. "I believe the award fails to accord the full measure of wage increase justified upon the record of the case," Mr. Sinsheimer said. "This increase in my opinion should range from 35 to 45 cents a day and should apply in appropriate proportions to all firemen, hostlers and hostler helpers in service on western railroads. I have joined in the award so that some measure of increase may be made effective even though not in the full amount I believed to be justified."

Under the provisions of the Railroad Labor Act a petition for the impeachment of the award of the board must be filed with the Federal District Court within 10 days after the decision of the board is filed in the same court.

Traffic

The Canadian National will open a ticket office in the Pacific Building, Portland, Oregon, on January 1.

The Union Pacific, effective January 1 will reduce the excess fare on the Los Angeles Limited between Salt Lake City, Utah, and Los Angeles, Calif., from five dollars to three.

Forty-seven cars filled with mules, 1,200 animals in all, were delivered in Norfolk, Va., on one day recently by the Southern; a single shipment from St. Louis, Mo., destined for Barcelona, Spain. A shipment of mules for Spain passes through Norfolk every two or three months.

The Chicago & North Western announces additional sleeping car service between Chicago and Rochester, Minnesota; leave Chicago 10:15 p.m., arrive at Rochester at 9:45 a.m. Returning, the service is operated to Milwaukee only, leaving Rochester at 7:32 p.m. and arriving in Milwaukee at 5:12 a.m.

The Missouri Pacific, in conjunction with the National Railways of Mexico, has established through sleeping car service from St. Louis, Mo., and from San Antonio, Texas, to Mexico City. Cars leave St. Louis at 6:45 p.m. and arrive at Mexico City at 6:25 p.m. the third day. From San Antonio cars leave at 9:45 a.m. and arrive at Mexico City the second day at 6:10 a.m.

Commodity committee reports presented at the fourteenth regular meeting of the Central Western Shippers Advisory Board at Twin Falls, Idaho, on December 15, indicate that car requirements for the first quarter of 1928 will total 187,881, which is a general average increase of 13 per cent compared with the same period last year. Over three hundred shippers and representatives of railroads attended the meeting.

Coal delivered at the nine Lake Erie ports by the railroads of Ohio and Pennsylvania in the month of November totaled 3,281,031 net tons; and a statement issued by the Cleveland Ore & Coal Exchange, showing the quantity dumped at each port, gives the number of cars as 58,399 and the average net tons per car as 56.18. The heaviest average loading appears in the statement of the Pennsylvania, at Ashtabula; 1,419 cars, average load 67.10 tons.

The recommendations governing the loading of lumber, logs, stone, structural materials, plates, rails, girders, etc., contained in the 1927 report of the American Railway Association Committee on Loading Rules, have been approved by letter ballot of the members and by the board of directors. These recommendations, together with revisions covered in Supplement No. 1 issued in April, 1927, are available for distribution in the form of a new supplement to the rules effective January 1,

1928. Copies can be obtained by addressing the secretary of the Mechanical Division of the American Railway Association.

J. F. J. Herbert, prohibition administrator for Maryland and the District of Columbia, has made public agreements entered into by him with the Pennsylvania and the Baltimore & Ohio designed to facilitate the prevention of illegal transportation of liquors over these roads. Agents of the government are to be accorded adequate privileges of inspecting all suspicious cars and, in some cases, the government agents may be stationed in freight houses; while the government will refrain from seizing cars.

The Interstate Commerce Commission, on petition of the Public Service Commission of New York, has vacated an order of November 13, 1920, insofar as the order prescribes rates for the transportation of milk, cream and potted cheese in intrastate commerce within the state of New York. The order had increased the rates to remove a discrimination in relation to interstate rates. The New York commission asked the federal commission to restore its jurisdiction over the rates and made an order continuing in effect those prescribed by the federal commission.

The Seattle (Washington) port commission has passed a resolution which authorizes the issuance of a call for a grain rate conference in Seattle in the immediate future to study the question of grain rates in the Pacific Northwest, paying particular attention to the Interstate Commerce Commission's decision alleged to give Portland preferential rates on grain originating south of the Snake river. The committee formulating the resolution proposes that the port immediately arrange for the employment of special counsel to conduct a suit against the present rate structure.

The Interstate Commerce Commission on December 9 announced a further postponement of its order of July 20, which called for reductions in the rates on deciduous fruit other than apples from California to all eastern points, under the Hoch-Smith resolution. The order was originally made effective as of October 10 but was later postponed to January 10 and is now postponed to February 10. The transcontinental railroads have applied to the courts to set aside the order on the ground that the commission's interpretation of the Hoch-Smith resolution results in confiscation.

Allegheny Advisory Board

The Allegheny Regional Advisory Board held its regular meeting at Pittsburgh, Pa., on December 15, with an attendance of 430. Estimates of the probable volume of freight traffic for the first quarter of 1928 show numerous increases and decreases. Coal, one of the principal products in this territory, has been subject to many fluctuations during the past year. In the northern West Virginia field the producers expect that they will require about ten per cent more cars than last year, but all other districts expect a decrease, the eastern Ohio

operators as much as 42 per cent. Coke is expected to move in 22 per cent less volume than a year ago.

Other decreases are as follows: Agricultural products, 5 per cent; iron, steel and their products, 5.9 per cent; sand, gravel, etc., 9.6 per cent; lumber, etc., 10.9 per cent. The movement of brick and clay products is expected to be about the same.

In the petroleum industry there is expectation of an increase of 1.3 per cent; cement, 12 per cent; automotive vehicles, 11.9 per cent; canned food, 12.5 per cent; fertilizer, 5 per cent.

Glass and glass products will probably fall off nine per cent.

The next meeting of the Allegheny board will be held at Pittsburgh on March 15.

Maritime Rate Controversy Moves Toward Settlement

Two more moves in the controversy between the Maritime provinces and the Canadian National over the enforcement of the legislation passed at the last session of the Canadian Parliament and providing for reductions in the freight rates for those provinces were taken last week. Following the two vehement speeches by Premier J. B. M. Baxter of New Brunswick in denunciation of the railway, the company issued a lengthy statement in which it contended that it had properly interpreted and observed the provisions of the legislation. Late in the week the Supreme Court of Canada issued a judgment on the appeal of the railway from the order of the Dominion Railway Board to keep open the St. John, N. B., and Ste. Rosalie, Que., gateways for the use of C. P. R. connections, an order which was closely related to the parliamentary legislation.

The Supreme Court issued a decision which gives no complete victory to any party to the dispute. It ordered that the Ste. Rosalie gateway be kept open and the St. John gateway closed. The words of the principal part of the Court's judgment are as follows: "We have come to the conclusion that in relation to the joint routes through Ste. Rosalie, the Board has jurisdiction to pronounce the orders under appeal; but as regards the joint routes by way of St. John our conclusion is that the orders of the Board are not within the ambit of its powers, the reading of the statute which governs the board in applying these orders to joint routes by way of St. John is open, in our opinion, to insurmountable objections; objections which do not proceed upon niceties of interpretation, but upon the unmistakable effect of the substantive enactments of the Act."

In replying to the many criticisms leveled at it for its attitude toward the Maritime Freight Rates Act the Canadian National late in the week issued a statement reading in part as follows:

"During the past months, since Parliament at its last session passed the Maritime Freight Rates Act, there has been almost continual discussion and criticism in certain sections of the Maritime provinces as to the attitude of the National Railways towards the problem of freight rates, and in particular as to the manner and extent which the legislation [calling for a reduc-

tion in freight rates] has been made effective. In certain instances it has even been claimed that the National Railways have deliberately flouted the wishes of Parliament as expressed in the legislation.

"Before discussing whether or not the National Railways have or have not properly interpreted the Maritime Freight Rates Act and made effective the freight rates required thereby it is necessary to know exactly what the National Railways were required to do. For this reason the pertinent sections of the legislation are quoted:

"3. (1) All persons or companies controlling, or concerned in the preparation and issue of tariffs or tolls to be charged in respect of the movements of freight traffic, whether on behalf of His Majesty or otherwise, upon or over the eastern lines specified in section four of this act, and hereinafter called 'preferred movements,' are hereby authorized and directed upon and after the first day of July, 1927, to—

"(a) Cancel all existing freight tariffs in respect of such preferred movements:

"(b) Substitute other tariffs for the tariffs so cancelled, showing a reduction in such tariffs of approximately 20 per cent:

"4. (1) The following are preferred movements as referred to in section three and other sections of this act:

"(a) Local traffic all rail—Between points on the eastern lines; for example, Sydney to Newcastle.

"(b) Traffic moving outward, westbound to points in Canada beyond the limit of the eastern lines at Diamond Junction or Levis; for example, Moncton to Montreal—the 20 per cent reduction shall be based upon the eastern lines proportion of the through rate or in this example upon the proportion applicable from Moncton west as far as Diamond Junction or Levis.

"(c) Traffic moving outward, export traffic, rail and sea—from points on the eastern lines through ocean ports on the eastern lines destined overseas, for example, Fredericton to Liverpool via St. John—the rate affected shall be that applicable from Fredericton to St. John.

"(2) Traffic moving over the car ferries shall be treated as all rail traffic.

"5. For greater clearness, but without intending to enlarge by any omission the scope of section four of this act, it is declared that the following are not preferred movements:

"(a) Traffic moving inward or outward to or from the United States, all rail—from or to points in the United States to or from points on the eastern lines.

"(b) Traffic moving inward, eastbound, from Canada, all rail—from points in Canada not on the eastern lines eastbound to points on the eastern lines; for example, Toronto to Moncton.

"(c) Import traffic to Canada, originating at points overseas; for example, Liverpool to Moncton or to Toronto.

"(d) Passenger movements and express movements.

"6. For accounting purposes, but without affecting the management and operation of any of the eastern lines, the revenues and expenses of the eastern lines (including the reductions herein authorized which shall be borne by the eastern lines) shall

be kept separately from all other accounts respecting the construction, operation or management of the Canadian National Railways. In the event of any deficit occurring in any railway fiscal year in respect of the eastern lines, the amount of such deficit shall be included in a separate item in the estimates submitted to Parliament for, or on behalf of the Canadian National Railways at the first session of Parliament following the close of such fiscal year.

"The interpretation placed on the legislation by the National Railways is that Parliament desired to accord to the territory Levis, Que., and east, south of the St. Lawrence River, a reduction of approximately 20 per cent in the rates on all traffic moving between points in that territory and 20 per cent in the proportion east of Levis, Que., in rates on traffic moving out of that territory to all points in Canada west of Levis. This reduction was to be applied on the traffic movements specified in section four of the legislation quoted above. Section five of the legislation indicates traffic on which no reduction was to be granted.

"Section three of the act, as quoted, instructed the officers of the National Railways to prepare and substitute new tariffs which should accord this reduction, the new tariffs to be filed with the Board of Railway Commissioners in the usual manner.

"Section six of the legislation as quoted provides that separate accounts must be kept for the National lines east of Levis, Que., and the amount of any deficit shall be included as a separate item in the National Railways estimates submitted to Parliament.

"Looking at the question as a whole, the direction of Parliament to the National Railways seems a simple one, and in general it is, but as every person more or less familiar with railway rates knows, it is impossible to make an exact 20 per cent reduction in all cases and this is particularly so where only a portion of a rate is to be reduced. As a matter of fact, there has been little or no criticism as to the manner in which the legislation has been made effective where the full 20 per cent reduction was to be given. The difficulty, if there is any, is only on traffic moving out of the Maritime Provinces to the rest of Canada where only a portion of the rate was to be reduced by 20 per cent.

"The officers of the National Railways have given effect to the 'Maritime Freight Rates Act' to the very best of their ability and that they have done so is amply proved by the fact that an actual test of the revenue received on traffic covered by legislation during a representative period since July 1 last shows that the reductions authorized by the tariffs amounted to 20.31 per cent, which is a slightly greater reduction than that required by the legislature."

The statement pointed out that the railroad could have no objection to the reduction since it was reimbursed by the government for this reduction. It also pointed out that a greater average reduction than that called for in the law would be an illegal burden on the rest of Canada. Recourse, it was pointed out, was provided by appeal to the Dominion Railway Board but no such appeal has been taken.

Sydney-Broken Hill Line Opened in Australia

Development of the western portion of New South Wales is expected in Australia to be greatly accelerated by the newly constructed railway line from Sydney to Broken Hill, which was officially opened recently, reports Trade Commissioner E. C. Squire, Sydney, to the Department of Commerce. The line, which is 699 miles in length, constitutes the longest main trunk railway in New South Wales, and traverses practically the breadth of the state, from the coastline to within a few miles of the western boundary.

The new connection with the Barrier has been achieved by extending the line from Condobolin (339 miles from Sydney), which town has been connected with Sydney for some years. The extension is, therefore, 360 miles in length, and proceeds almost due west via Trida and Ivanhoe to Menindie, where it crosses the Darling River. The river is spanned by a bridge, which will carry both railway and vehicle traffic, and is provided with a lifting span to enable river steamers to pass.

By the new route the distance from Syd-

ney to Broken Hill will be 699 miles, compared with 1,407 miles by way of Melbourne and Adelaide. The journey, which had required three nights and two days, is reduced to 25 hours by the new line.

Timetable Conference at Prague

Twenty-eight European countries, participating in the international timetable conference at Prague, October 17-22, voted to admit delegates of the League of Nations, but rejected other motions on its program, including one that all annual timetables become effective on the second Sunday in May instead of on May 15 as at present; one that the "summer time" be introduced in all countries of middle Europe, and one that "summer time" be put in operation on the same day as the annual time tables. The conference agreed to shorten the schedule of the Lemburg-Cracow-Prague-Vienna express four hours. Two other matters considered were the bringing of arrivals and departures of international trains into harmony with those of air services, and the extension of the existing Berlin-Prague-Budapest-Belgrade railway service to Greece.

Equipment and Supplies

Freight Cars

THE PACIFIC FRUIT EXPRESS is about to inquire for 2,000 refrigerator cars.

THE UNITED FRUIT COMPANY is inquiring for 15 flat cars of 20 tons' capacity.

THE TEXAS COMPANY is inquiring for 300 insulated tank cars of 10,000 gallons and 50 tons' capacity.

THE MARYLAND SLAG COMPANY has ordered 2 extension side dump cars of 35 cu. yd. capacity, from the Clark Car Company.

THE WARNER-QUINLAN COMPANY, New York, has ordered 15 insulated tank cars from the American Car & Foundry Company.

THE TIMKEN ROLLER BEARING COMPANY has ordered 2 extension side dump cars of 30 cu. yd. capacity, from the Clark Car Company.

THE LEHIGH COAL & NAVIGATION COMPANY has ordered 4 extension side dump cars of 30 cu. yd. capacity, from the Clark Car Company.

THE LUZERNE COUNTY GAS & ELECTRIC COMPANY has ordered 1 extension side dump car of 30 cu. yd. capacity, from the Clark Car Company.

THE METAL & THERMIT CORPORATION, New York, has ordered 1 Class V tank

car, for carrying liquid chlorine, from the General American Tank Car Corporation.

THE LOUISVILLE & NASHVILLE has ordered 1,250 gondola cars from the Pressed Steel Car Company, 200 low-side gondolas, 200 auto, 300 box and 200 stock cars from the Mt. Vernon Car Mfg. Co. Inquiry for this equipment was reported in the *Railway Age* of December 10.

THE CHICAGO & NORTH WESTERN has ordered 500 hopper cars from the Pullman Car & Manufacturing Corporation and 500 flat cars from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of November 12.

THE ATCHISON, TOPEKA & SANTA FE has placed orders for 3,850 freight cars, inquiry for which was reported in the *Railway Age* of November 26. At the time of going to press, reports indicated that 500 gondola cars and 300 flat cars had been placed with the American Car & Foundry Company, 500 refrigerator cars with the Pullman Car & Manufacturing Corporation, 750 stock cars with the Pennsylvania Tank Car Company and 100 ballast cars with the Rodger Ballast Car Company.

Passenger Cars

THE ST. LOUIS-SAN FRANCISCO is inquiring for 15 baggage and mail cars and five baggage cars.

THE NEW YORK, WESTCHESTER & BOSTON has ordered 10 motor passenger train cars from the Osgood Bradley Car Company.

THE CITY OF SEATTLE, SKAGIT RAILWAY, has ordered one combination passenger and baggage gasoline rail motor car from the J. G. Brill Company.

THE PENNSYLVANIA contemplates buying 200 coaches, 300 passenger refrigerator cars, 100 baggage-express cars, 45 baggage-scenery cars, 25 horse-express cars and 20 passenger and baggage cars.

THE CHICAGO & EASTERN ILLINOIS has ordered 2 combination mail and smoking cars from the Pullman Car & Manufacturing Corporation. Inquiry for this equipment was reported in the *Railway Age* of October 29.

THE PENNSYLVANIA has ordered 6 double power plant, 73-ft. gas-electric rail motor cars from the J. G. Brill Company, and one 73-ft. car body and trucks have been ordered by the International Motor Company from the J. G. Brill Company for the Pennsylvania.

Iron and Steel

THE SOUTHERN is inquiring for steel for bridges in North Carolina, calling for 150 tons of steel.

THE CHESAPEAKE & OHIO has ordered 250 tons of steel for two bridges, from the American Bridge Company.

THE NEW YORK CENTRAL LINES have purchased their requirements of track material, consisting of tie plates, spikes and bolts, to be used in connection with new rail purchased some time ago, and also for maintenance purposes during the first six months of next year, at a cost of about \$3,000,000. The orders for the track material were placed with the Bethlehem Steel Company, Carnegie Steel Company, Jones & Laughlin Steel Corporation, Illinois Steel Company, Inland Steel Company and the Bourne-Fuller Company. This railroad system purchased in November 177,140 tons of rail at a cost of \$7,600,000, for 1928 delivery, as reported in the *Railway Age* of November 12.

Machinery and Tools

THE ILLINOIS CENTRAL is inquiring for one 34-in. upright drill press.

Signaling

THE TEXAS & PACIFIC has ordered from the General Railway Signal Company, a mechanical interlocking for Alexandria, La.; 13 working levers.

THE GREAT NORTHERN has ordered from the General Railway Signal Company, material for automatic block signaling between Wenatchee, Wash., and Scenic, 68 miles. Color-light signals will be used, Type D.

Construction

CAMBRIA & INDIANA.—The Interstate Commerce Commission has granted a further extension of time, to June 30, 1929, for the completion of this company's proposed extension in Pennsylvania, under the certificate issued by the commission February 11, 1925.

CANADIAN NATIONAL.—Plans are being considered for the construction of a new station at Hamilton, Ont., to cost about \$1,000,000. The project will involve not only the building of a station but laying of new track at the terminal. This road also has under consideration the construction of a new hotel at Halifax, to have 160 bedrooms, and be designed for later additional stories to give it an ultimate capacity of 300 rooms. Combined with the hotel a new terminal is being planned, a structure to be 180 ft. by 100 ft. The project involves landscaping and rebuilding of roadway approaches.

HUDSON BAY.—The Dominion Construction Company, Toronto, Ont., has been awarded a joint contract with the Tomlinson Construction Company, Winnipeg, Man., for the construction of a railway from Sheman, Man., a point on the Hudson Bay, eight miles north of the Pas, 84 miles north and west to the Flin Flon mining area along the Saskatchewan-Manitoba border. These companies have contracted to provide a line over which trains carrying supplies can be operated from Sheman to Flin Flon by December, 1928, and which will be complete in every respect by September, 1929.

PENNSYLVANIA.—Plans of this road for extending the facilities of the yard at Altoona, Pa., provide for making that yard one of the largest. The eastbound advance freight yard will be extended according to plans of the road and a relay yard will be built.

Supply Trade

The American Hoist & Derrick Company, St. Paul, has moved its Seattle office, from 1501, L. C. Smith building, to 503 Biltmore apartments.

George K. Taylor, has been appointed southern representative of the Youngstown Sheet & Tube Co., Youngstown, Ohio, with headquarters at Atlanta, Ga.

Benjamin Bruce Shaw, formerly chief engineer of the Cuba Railroad, has been appointed sales engineer of the Argyle Railway Supply Company, Chicago.

The Harnischfeger Corporation, Milwaukee, Wis., has established a branch office at 340 Rockefeller building, Cleveland, Ohio. J. G. Connors is district manager.

Richard Devens, formerly manager of the Brown Hoisting Machinery Company, has been appointed sales engineer of the Link Belt Company, Chicago, with headquarters at New York.

The Bridgeport Brass Company, Bridgeport, Conn., in order to take care of its increased business, has opened an office in the Park Square building, Boston, Mass. William J. Hawkins is in charge of the new office.

Van Cortright Mekeel, formerly connected with the Taylor-Wharton Iron & Steel Company, High Bridge, N. J., in capacities of special research investigator, mechanical engineer and sales engineer, has resigned to become special representative of the Nugent Steel Castings Company, Chicago.

C. J. Buck has been appointed service manager of the Franklin Railway Supply Company, Inc., New York, effective January 1, succeeding John L. Bacon, who has resigned to enter business for himself. Prior to 1918 Mr. Buck was engaged as a machinist and inspector in



C. J. Buck

the automobile industry. In March, 1918 he entered the railway supply business with the Franklin Railway Supply Company, Inc., as inspector in charge of the testing department on car lighting equipment. In 1919 he went with the J. Stone Company in the same capacity, but returned to the former company in June, 1920 in the locomotive department as inspector at the locomotive builder plants. On January 1, 1923 he was pro-

moted to chief inspector, having supervision of the inspection of all Franklin equipment and its application at the plants of the various locomotive builders, which position he has held until his promotion to service manager.

W. J. Walsh, vice-president of the Galena Signal Oil Company with headquarters at Chicago, has resigned effective January 1 to become president of the Transportation Service Corporation, Chicago. He entered railway service in 1886 as an apprentice in the shop of the Cleveland, Cincinnati, Chicago & St. Louis at Cleveland, Ohio. In 1889 he was made a machinist on the Cincinnati, New Orleans & Texas Pacific and during the period to 1891 was a locomotive engineer, a general foreman, and a mechanical instructor on the first air-brake car ever constructed. In the latter year, he was promoted to division master mechanic, which position he held until 1896 when he resigned to become lubrication engineer of the Galena Signal Oil Company at Chicago. In 1910



W. J. Walsh

he was promoted to manager of the Chicago district, and on February 4, 1920, he was elected vice-president, which position he has held until his resignation.

W. Homer Hartz, treasurer of the Morden Frog & Crossing Works, Chicago, who has also been elected vice-president and manager of sales succeeding Arthur C. Smith, deceased, was born on December 11, 1887, at Tarrytown, N. Y., and graduated from Purdue University in 1907. He entered railroad service in the summer of 1904 in the engineering department of the Chicago Southern, now a part of the Chicago, Terra Haute & Southeastern, where he was engaged in location and construction work. In December, 1906, he was employed on track elevation work for the Pennsylvania and in 1907 entered the employ of the Baltimore & Ohio in the division engineer's office at Cumberland, Md. In the following year he went with the Oliver Iron Mining Company at Mt. Iron, Minn., where he remained until 1909 when he entered the employ of the Chicago, Milwaukee & St. Paul in the engineering department

at Chicago. In 1911 he became associated with the Morden Frog & Crossing Works as a draftsman and later was promoted to inspector and then to chief clerk and purchasing agent, which posi-

tion he held until 1915 when he was promoted to secretary. In 1922 he was appointed treasurer and assistant manager of sales, which position he has held until his recent promotion.

C. Marshall Taylor has been appointed vice president and general manager of the Curtin-Howe Corporation, New York in which capacity he will be concerned with the manufacture and sales of zinc meta-arsenite, a new wood preservative. He was born on February 8, 1884, at Edgemont, Pa., and graduated from Swarthmore College in 1904, where he was an instructor in chemistry in 1904 and 1905. During 1905 and 1906 he served as a chemist for the Charles E. Hires Company, in the latter year becoming associated with the International Creosoting and Construction



C. Marshall Taylor

Company, at Texarkana, Tex. He left this company in 1910 to become superintendent of the Port Reading Creosoting plant of the Reading Company and the Central Railroad of New Jersey. Mr. Taylor has been an active member of the American Wood Preservers' Association, of which he was president

The Southwark Foundry & Machine Company, Philadelphia, Pa., jointly with the Emery-Tatnall Company, have established a testing equipment division and are offering a diversified line of physical testing machines and instruments of high quality.

George B. Wood, Philadelphia, Pa., is manager of railway sales of the Goodall Rubber Company, Inc., and **Charles L. Butler**, who formerly represented the Detroit Lubricator Company, has been appointed manager of railway sales in the Chicago district with headquarters at Chicago. A typographical error in an item in the *Railway Age* of December 10 stated the new position of Mr. Butler incorrectly.

Charles W. Bell formerly of the Edison Storage Battery Company, has been appointed general sales manager of the Gould Storage Battery Company, Inc., with headquarters at Depew, N. Y. **L. C. Hensel** formerly of the Gould Car Lighting Corporation, has been appointed manager of railway sales, with headquarters in New York. **P. J. Linnekin**, has been appointed assistant to the manager of railway sales with headquarters at New York. **A. M. Anderson** formerly of the Edison Storage Battery Company has been appointed sales engineer in charge of railway sales in Chicago. **A. J. Davis**, has been appointed railway sales representative with headquarters at New York.

Obituary

James R. Pratt, for many years president of the Home Lumber Company, Inc., New Orleans, La., died suddenly at his home in Gulfport, Miss., on December 12. He was born at Lynchburg, Tenn., on December 7, 1857, and went to Gulfport in 1902.

William P. Palmer, president of the American Steel & Wire Company, died at his home in Cleveland, Ohio on December 17, after a short illness. Mr. Palmer was born on June 17, 1861. He served as secretary to Carnegie, Phipps & Co., in 1887. Subsequently he served as general sales agent, and assistant to president of the Carnegie Steel Company and from 1896 to 1898 as vice-president of the Illinois Steel Company. He had been general manager and president of the American Steel & Wire Company since 1899, also served as president of the American Mining Company and a director of the United States Steel Corporation.

Joseph G. Butler, Jr., pioneer steel manufacturer, died at his home in Youngstown, Ohio, on December 19. Mr. Butler was born at Temperance Furnace, Mercer county, Pa., near

Youngstown, in 1840. He began his career as a clerk in an iron rolling mill at Niles, Ohio, and later became one of the foremost iron masters of the Mahoning Valley and took an active part in the development of the iron and steel processes in this country. He was also a director of the American Iron & Steel Institute and had served as vice-president of the Briar Hill Steel Company and the Ohio Steel Company. Mr. Butler was the author of several books, including the one called *Fifty Years of Iron and Steel*.

General Charles Miller, president of the Franklin Railway Oil Company, of Franklin, Pa., founder of the Galena Signal Oil Company, and one of the pioneer oil producers in the Franklin, Pa., district, died on December 20 at his home in Miller Park at the age of 84. General Miller was the first man to recognize the great importance of scientific study of oil and lubrication problems in transportation, and he taught the railroads the best ways and means to efficient economical use of lubricating oils. In July, 1869, General Miller formed a partnership with three associates and began to manufacture an oil in all appearances like pure West Virginia oil and meeting the same tests. The product was, however, superior because of the addition of certain materials. This company was the first to formulate a plan of furnishing railway oils under contracts guaranteeing the cost per thousand miles on locomotives and freight cars. It was also the first to organize a department of lubrication experts whose services were given to the railroads teaching all ranks of employees how to use oil economically. General Miller severed his connection with the Galena Signal Oil Company in 1919 and became head of the Home Oil Refining Company as chairman of the board. General Miller, at the time of his death, was president of the Franklin Railway Oil Company, chairman of the board and a director of the American Steel Foundries and president of the Lake Erie, Franklin & Clarion.

Trade Publications

A NEW COALING GATE.—In a folder issued by the Roberts and Schaefer Company, Chicago, the advantages of a new side-cut, non-skim coaling gate for coaling stations are outlined in detail. The character of construction and manner of operation are made clear by drawings and photographs.

JOURNAL BEARINGS.—The SKF Industries, Inc., 40 East Thirty-fourth street, New York, describes in its catalogue No. 187 the SKF journal bearing for railroad equipment. This bearing is a self-contained and self-aligning unit. No internal adjustment is required to the bearing itself, and complete freedom of alignment is assured in passing over rail joints and track irregularities. Cross-sectional drawings clearly illustrate these features of the bearing. The closed-up construction of the journal box excludes considerable foreign matter, such as water, grit and abrasive.

Financial

BALTIMORE & OHIO.—Underwriting Fees.—The Interstate Commerce Commission has amended its order of July 18, in which it authorized an issue of additional common stock so that the company may use \$1,422,956 of the proceeds of the stock to pay underwriting fees incurred in connection with the issue.

CENTRAL RAILROAD COMPANY OF NEW JERSEY.—Bonds Sold.—J. P. Morgan & Co., the First National Bank and the National City Company have sold \$5,000,000 general mortgage 4 per cent bonds dated July 1, 1887, and due July 1, 1987, at 98½ and interest. Of the proceeds, \$4,987,000 will be used to retire the like amount of bonds of the American Dock & Improvement Company, which have been guaranteed by the railroad. Details concerning the issue are given as follows:

Of the \$50,000,000 bonds authorized by the general (first) mortgage, dated July 1, 1887, to the Central Union Trust Company of New York, Trustee, \$48,924,000 bonds (in which is included this issue) are outstanding. The general mortgage is a first lien upon 376 miles of railroad in New Jersey in which is included the railroad company's main line extending from Jersey City to Phillipsburg and its large and valuable terminal property at Jersey City. These bonds are also secured by the pledge of the leases under which the railroad company operates its lines in Pennsylvania, extending from Easton to Scranton, 186 miles of railroad. They are further secured by a pledge of the leases under which the railroad company operates a number of small branches in New Jersey, and by the pledge of certain of its railroad and floating equipment. The only lien on any portion of the property now covered by the mortgage superior thereto is the lien securing \$4,987,000 bonds of the American Dock & Improvement Company, which bonds will be redeemed on January 1, 1928, and the lien satisfied.

CHICAGO & NORTH WESTERN.—Equipment Trust.—The Interstate Commerce Commission has authorized the issuance of \$2,610,000 equipment trust of 1925 certificates, Series S, to be sold at not less than 101.32 to Salomon Brothers & Hutzler of New York, who submitted the highest of 15 bids. On this basis the average annual cost to the carrier will be approximately 14.29 per cent. The equipment includes 500 freight cars and 92 passenger train cars, having a total approximate cost of \$3,492,610.

CHICAGO, BURLINGTON & QUINCY.—Final Valuation.—The Interstate Commerce Commission, in its final valuation report, finds the total final value for ratemaking purposes of the properties of the Burlington and affiliated carriers used for common carrier purposes as of June 30, 1917, to be \$566,179,438, including \$11,198,000 for working capital. The tentative valuation figure was \$563,667,741, of which \$497,441,808 represented property used by the Burlington itself. The report says that at the hearing the president of the company urged the addition of amounts to various items which range from 50 to 100 per cent in excess of those tentatively found, and that a sum equal to 25 per cent of the cost of reproduction new plus the present value of lands be added for going-concern value, or ap-

proximately \$163,000,000. After discussing the various phases of the going concern argument the commission says that its final value is reached "after careful consideration to all facts of record pertaining to the value of the Burlington as an organized, developed, well-maintained and seasoned property, in operation as a going concern." The final value of the owned and used carrier property of the Burlington itself is placed at \$496,100,000, that of the Colorado & Southern at \$33,975,000, that of the Fort Worth & Denver City at \$18,270,000, that of the Wichita Valley at \$695,000 and that of the Quincy, Omaha & Kansas City at \$5,800,000. The Burlington had asked for the inclusion of a separate figure to represent its earning power. As to this the report says: "We are of the opinion that it is logically unsound to include in the rate base a factor the value of which varies or changes with the rate," and it concludes that "nothing should be included in the final values on account of the earning power of the Burlington properties."

ERIE.—Equipment Trust Certificates.—The Interstate Commerce Commission has amended its order of July 9, 1927, approving the issuance of this company's Series NN equipment trust certificates so as to permit the inclusion of 15 locomotive tenders having a total approximate cost of \$211,000. When the Erie bought the equipment, the purchase of which was financed by this issue, it was expected that the equipment in question would cost \$8,725,000. It was later discovered that the actual cost was \$179,000 less than the estimated cost.

MINNEAPOLIS & ST. LOUIS.—Receiver's Certificates.—The Interstate Commerce Commission has granted authority for the issuance of \$375,000 receiver's certificates to renew or extend certificates of like amount maturing in December, 1927, and January and February, 1928.

MISSOURI PACIFIC.—Securities of Subsidiaries.—The Interstate Commerce Commission has authorized the Union Railway to extend the time for payment of \$1,000,000 first mortgage bonds 20 years from August, 1927.

The Interstate Commerce Commission has authorized the Iron Mountain Railroad of Memphis to extend the time for payment of \$500,000 first mortgage bonds from August, 1920, to August, 1947.

All of the bonds to be extended are owned by the Missouri Pacific.

MISSOURI PACIFIC.—Acquisition.—This company has applied to the Interstate Commerce Commission for authority to acquire control by lease of the Chester & Mt. Vernon, which has applied to the commission for authority to acquire and operate a line from Menard to Mt. Vernon, Ill., 64 miles, now operated by the receiver of the Wabash, Chester & Western.

MOBILE & OHIO.—Bonds.—The Interstate Commerce Commission has authorized \$13,879,000 4½ percent refunding and improvement mortgage bonds series of 1977. Of the bonds, \$3,000,000 are to be issued to reimburse the company's treasury for

capital expenditures and the remainder for the purpose of meeting maturities. The bonds are to be sold to J. P. Morgan & Co., at 9½ per cent giving an annual cost to the carrier of 4.90 per cent.

NEW YORK, CHICAGO & ST. LOUIS.—*Notes.*—The Interstate Commerce Commission has authorized this company to issue a promissory note for \$2,000,000 to the Union Trust Company of Cleveland. The note will be payable in 6 months and the proceeds will be used to assist the carrier in meeting the requirements for cash. The commission in the findings included the following comments:

From the foregoing it appears that the inability of the applicant to issue short-term notes under the provisions of paragraph (9) of section 20a to the amount now proposed, is due to the issue of such notes in connection with the acquisition of the securities of another carrier, assets which presumably are not now available for conversion into cash to meet the applicant's current needs. It is our view that it was not the intent of Congress, in exempting short-term notes to a limited extent from the regulatory power, that carriers should exhaust their freedom of action in short-term financing by borrowing for purposes other than those strictly germane to the maintenance and operation of their properties in interstate commerce and then be forced to come to us for authority to issue short-term notes for purposes related to the performance of their service to the public as common carriers.

The balance sheet mentioned shows that the applicant holds unpledged \$15,798,066 of common stock, and \$1,424 of cumulative preferred stock, series A, which, under the terms and conditions of our certificate and order of June 18, 1923, may be sold by the applicant without our further order, and the proceeds used for capital purposes. While the applicant represents that the issue now proposed is necessary in order to replenish its treasury, it shows no reason why the treasury stock may not be converted into cash. In granting the authority requested, we shall expect the applicant to take immediate steps to place its finances on such basis that it will not be necessary for it to renew the proposed note.

Commissioner Eastman dissented, saying:

No public hearing has been held in this case. It seems to me that before approving the issue of the promissory note in question such a hearing should be held in order that there may be developed fully and of record the circumstances leading up to the alleged shortage of working capital and the necessity, if it exists, for the proposed method of financing which the majority sanctions, although indicating its disapproval.

NEW YORK, NEW HAVEN & HARTFORD.—*Bonds Sold.*—J. P. Morgan & Co., the First National Bank, the National City Company, Kidder, Peabody & Co., and Lee Higginson & Co. have sold \$31,000,000 40-year first and refunding mortgage 4½ per cent bonds, series of 1927, maturing December 1, 1967. The bonds were offered at 9½ per cent and accrued interest, giving a yield of 5 per cent to maturity.

The proceeds of this issue will be applied to retirement of \$20,893,300 of six per cent collateral notes held by the United States Government, \$3,415,200 of six per cent and seven per cent equipment trust notes, and to the reimbursement of the company's treasury for indebtedness heretofore retired.

The issue and sale of these bonds, together with the previous sale of \$49,036,700 of seven per cent preferred stock, completes the company's program for refunding \$70,030,000 of short-term indebtedness to the United States Government. Upon completion of the present financing, the funded debt outstanding in the hands of the public, including equipment trust and collateral notes, will have been reduced from \$318,812,000 as of December 31, 1926, to \$281,884,700, so that the ratio of funded debt to total capital liabilities will have been reduced from 66.9 per cent to 57.7 per cent. Upon completion of such financing, there will be outstanding \$181,600,550 debt secured by the first and refunding mortgage, consisting of these \$31,000,000 series of 1927 bonds, \$110,080,450 of pre-existing obligations, and \$40,520,100 of obligations secured by pledge of \$48,048,000 first and refunding mortgage bonds.

The New Haven's total fixed charges in 1927 are estimated at \$18,420,000. Adjusted to give effect as of January 1, 1927, to the refunding program, including the issuance of these bonds, the 1927 fixed charges would have approximated \$15,900,000.

The bonds are to be issued under the first and refunding mortgage, dated December 9, 1920, as amended by supplement to be executed under date of December 1, 1927.

The first and refunding mortgage covers 1,347 miles of railroad owned in fee, leasehold interests in 847 miles of railroad, and the rights of entrance to and use of the Grand Central Station. The mortgage is a first lien on 435 miles (including all of the main line from New York to Springfield), and, subject to closed mortgages securing \$62,714,000 bonds outstanding with the public, is a second lien on 900 miles of the mileage owned.

The first and refunding mortgage as amended will limit the issuance of bonds thereunder to an amount which, after adding the outstanding prior debt and deducting the amount of bonds reserved to retire prior debt, shall never exceed twice the outstanding capital stock and premiums paid in thereon.

PENNSYLVANIA.—*Abandonment of Branch.*—The Interstate Commerce Commission has issued a certificate authorizing the Pennsylvania to abandon 18.26 miles of its Fairbrook branch, which extends from Tyrone, Pa., to Fairbrook, 20 miles. This line was originally built to serve iron ore operations which have since ceased operating.

PITTSBURGH & LAKE ERIE.—*Stock Dividend.*—The Interstate Commerce Commission has approved this company's proposal to issue a stock dividend of 20 percent consisting of \$7,197,100 capital stock having a par value of \$50 a share.

The Interstate Commerce Commission pointed out that the company had a large uncapitalized surplus, and the the capitalization after the proposed stock dividend would be less than the investment in road and equipment alone, and that the company's remaining uncapitalized surplus would be sufficient for the purposes for which a surplus should be accumulated. As of July 31, 1927, the company had an excess of investment in road and equipment over its capitalization of \$17,899,003. Its corporate surplus as of the same date was \$51,512,088.

Commissioner Eastman dissented.

PULLMAN COMPANY.—*Tentative Valuation of Carrier Property.*—The final value for rate-making purposes of the property owned and used for common-carrier purposes as of June 30, 1919, by the Pullman Company was placed at \$110,000,000 in a tentative valuation report made public by the Interstate Commerce Commission on December 21. The report showed that the company also leased and used carrier property to the amount of \$44,710. The company had outstanding on valuation date a total capitalization of \$117,105,960, all in common stock. The original cost of the entire carrier property could not be ascertained, the report says, but the original cost of the equipment, cars and linen was found to be \$137,585,327, exclusive of \$7,871,924 reported by the Pullman Company as costs but not supported by accounting records. The investment of the company in sleeping-car property and land was stated in its

books as \$144,522,062, but the report says that with readjustments required by the accounting examination this would be reduced to \$143,310,988. This includes 20 per cent of the cost of the company's general office building in Chicago as an estimate of the "non-carrier" portion of it. The cost of reproduction new of the carrier property other than land and materials and supplies was placed at \$142,233,410, of which \$136,197,014 represents equipment, and the cost of reproduction, less depreciation, at \$95,365,756, of which \$90,762,807 represents equipment. Aside from the carrier property the report shows that the company had on valuation date investments in non-carrier property amounting to \$34,197,349, of which \$17,346,784, recorded as investment in miscellaneous physical property, applies to its manufacturing department, and \$16,850,565 represents securities of other companies.

WABASH, CHESTER & WESTERN.—*Leased by Missouri Pacific.*—This railroad, operating a line between Menard, Ill., and Mt. Vernon, 64 miles, has been leased by the Missouri Pacific for a period of 10 years. Connection is made with the Missouri Pacific at Chester, Ill.

Dividends Declared

Allegheny & Western.—3 per cent, payable January 1, 1928, to holders of record December 20.

Boston & Maine.—First preferred D, 2½ per cent, quarterly; first preferred E, 1½ per cent, quarterly, both payable January 2, 1928, to holders of record December 16.

Boston, Revere Beach & Lynn.—1½ per cent, quarterly, payable January 2, 1928, to holders of record December 31.

Canada Southern.—\$1.50, semi-annually, payable February 1, 1928, to holders of record December 30.

Cleveland, Cincinnati, Chicago & St. Louis.—Common, 2 per cent, quarterly; preferred, 1½ per cent, quarterly, both payable January 20, 1928, to holders of record December 30.

Detroit River Tunnel.—3 per cent, semi-annually, payable January 16, 1928, to holders of record January 9.

Elmira & Williamsport.—Preferred, \$1.61, payable January 1, 1928, to holders of record December 20.

Great Northern.—Preferred, 2½ per cent, semi-annually, payable February 1, 1928, to holders of record December 27.

Lake Erie & Eastern.—2 per cent, payable January 3, 1928, to holders of record December 23.

Mahoning Coal Railroad.—Common, \$12.50, quarterly, payable February 1, 1928, to holders of record January 16. Preferred, \$1.25, quarterly, payable January 3, 1928, to holders of record December 23.

New York Central.—2 per cent, quarterly, payable February 1, 1928, to holders of record December 31.

Northern Securities.—4½ per cent, semi-annually, payable January 10, 1928, to holders of record December 24.

Philadelphia & Trenton.—2½ per cent, quarterly, payable January 3, 1928, to holders of record December 20.

Pittsburgh & Lake Erie.—\$2.50, semi-annually, payable February 1, 1928, to holders of record December 30.

Seaboard Air Line.—Semi-annual interest of 2½ per cent on adjustment income bonds, payable February 1, 1928.

Troy Union.—6 per cent, annually, payable January 16, 1928, to holders of record December 30.

United New Jersey Railroad & Canal Companies.—2½ per cent, quarterly, payable January 10, 1928, to holders of record December 21.

Average Price of Stocks and of Bonds

	Dec. 20	Last week	Last year
Average price of 20 representative railway stocks..	121.31	121.37	104.34
Average price of 20 representative railway bonds..	97.10	97.35	92.55

Officers

Executive

B. E. Holloway, executive president of the National Railways of Mexico, with headquarters at Mexico, D. F., has tendered his resignation. A meeting of the board of directors will be held shortly to take up Mr. Holloway's resignation.

Alfred R. Howard, who will retire as vice-president, secretary and treasurer of the International-Great Northern, with headquarters at Palestine, Tex., on January 1, was born on April 20, 1852. He attended grammar school and high school at Philadelphia, Pa., and entered railway service in 1871 as an axman



A. R. Howard

on the I. & G. N. Within a short time he became chief clerk in the office of the treasurer and in 1873 he entered the auditing department as a clerk. From 1881 to 1890 he served consecutively as chief clerk to the master mechanic, as chief clerk to the treasurer and as cashier. Mr. Howard was then appointed assistant treasurer, with headquarters at Palestine, a position he held until his promotion to secretary and treasurer in 1892. He occupied the position of treasurer from 1914 to 1923 and on the latter date he was elected vice-president, secretary and treasurer, a position he has held continuously up to the present time. During the period of federal control Mr. Howard served for a time as federal treasurer of the Galveston, Houston & Henderson.

George L. R. French, assistant vice-president and general manager of the Rutland, with headquarters at Rutland, Vt., has been appointed vice-president and general manager, with the same headquarters, succeeding **George T. Jarvis**, who died recently.

Operating

M. C. Williams, acting superintendent of the Third division of the Oregon-Washington Railroad & Navigation

Company, with headquarters at Spokane, Wash., has been promoted to superintendent, with headquarters at the same point, succeeding **William Connolly**, who retired from active service on December 1 after a leave of absence.

Financial, Legal and Accounting

R. C. Pearson has been elected assistant treasurer of the Seaboard Air Line, with headquarters at Portsmouth, Va.

Mechanical

E. P. Marsh, superintendent of car shops of the Chicago & North Western, with headquarters at Chicago, has been promoted to assistant superintendent of the car department, assigned to special duties and with headquarters at Chicago. **George E. Collins**, assistant superintendent of car shops, with headquarters at Chicago, has been promoted to superintendent of car shops replacing Mr. Marsh.

Engineering, Maintenance of Way and Signaling

Edward R. Scott, traveling accountant for the maintenance of way department of the lines Buffalo and East, of the New York Central, has been appointed office engineer in the maintenance of way department of the same lines, with headquarters at New York City, succeeding **J. F. McDonald**, who will be associated with **J. V. Neubert**, chief engineer maintenance of way.

Obituary

Joseph H. DeSalis, former master mechanic on the New York Central at East Syracuse, N. Y., died there on October 27 of heart disease.

W. A. Rooks, auditor of freight accounts of the Seaboard Air Line, died at his home in Norfork, Va., on December 13, after an illness of several months.

Sidney U. Rhymer, signal engineer and superintendent of telegraph of the Chicago & Alton, died on December 20 from pneumonia at Bloomington, Ill.

Ernest R. Bruce, director of exhibits, department of colonization and development of the Canadian Pacific, died suddenly in Montreal, Que., on December 14.

Allan Purvis, general superintendent of the Quebec district and later of the Ontario district of the Canadian Pacific from 1916 until his retirement from railroad service to enter private business in 1920, died in a hotel at Los Angeles, Cal., on December 15.

William L. Maury, valuation accountant of the International-Great Northern, with headquarters at Palestine, Tex., and immediately prior to 1918 consult-

ing auditor of that company, died on December 13 at Houston, Tex. Mr. Maury would have retired under the pension rules of that railroad on January 1. A sketch of his railway career appeared in the *Railway Age* of December 17, page 1237.

E. O. Faulkner, who was in charge of subsidiary properties on the Coast lines of the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal., and until 1918 was manager of the tie and timber department of the Santa Fe, with headquarters at Los Angeles, died in that city on December 17. Mr. Faulkner was a pioneer in the application of timber preservation to ties, piles and other timbers used by American railroads.

Silas Wright DeWolf, vice president and general manager of the Texas-Mexican, with headquarters at Laredo, Tex., who died on December 3, was born on February 17, 1859, at Columbus, Ga. After attending the University of Georgia he entered railway service in September, 1886, in the engineering department of the Central of Georgia. In March, 1889, Mr. DeWolf became a levelman on surveys for the construction of the Savannah, Americus & Montgomery (now a part of the Seaboard Air Line) in Georgia and in the same year he was appointed roadmaster on the Mexican National (merged as the Na-



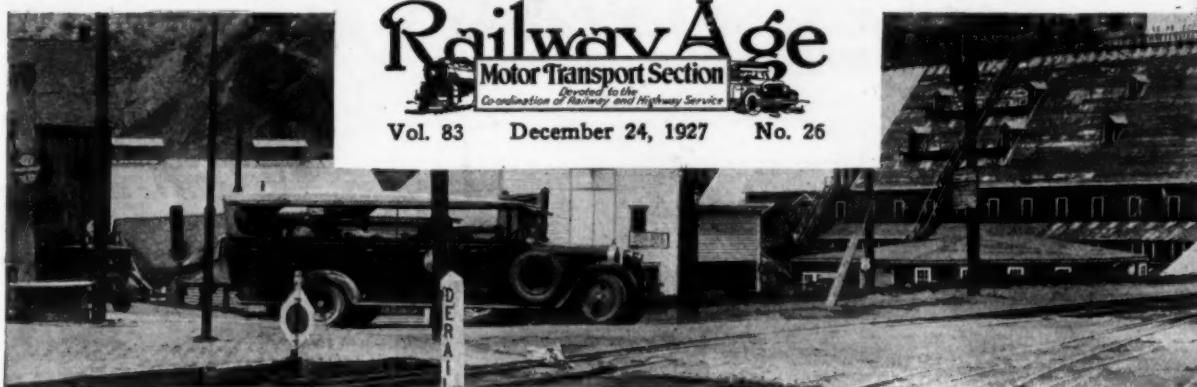
S. W. DeWolf

tional of Mexico) at Laredo where he remained until September, 1901, when he was appointed roadmaster on the Mexico Southern at Puebla, Pue. From May, 1902, to May, 1903, he served as superintendent of the Ixtlahuaca, Mani & Nijini, then becoming resident engineer of the Mexican National and later agent for this road for Texas. On August, 1, 1908, Mr. DeWolf was appointed general superintendent of the Texas-Mexican. For three years from 1909 to 1912 he engaged in private business, returning to railroad service as general superintendent of the Texas-Mexican. Mr. DeWolf was promoted to general manager on December 1, 1914, being elected vice-president and general manager on July 1 1915, and holding the latter position continuously until the time of his death.

Railway Age

Motor Transport Section
Devoted to the
Co-ordination of Railway and Highway Services

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Used also to transport employees and to free line for work and freight trains.

D. & R. G. W. Operates on 500 Miles of Highway 1297

Three subsidiaries serve eastern, central and western Colorado—Operations earn a profit
for the railroad.

Rail Car or Motor Coach? 1305

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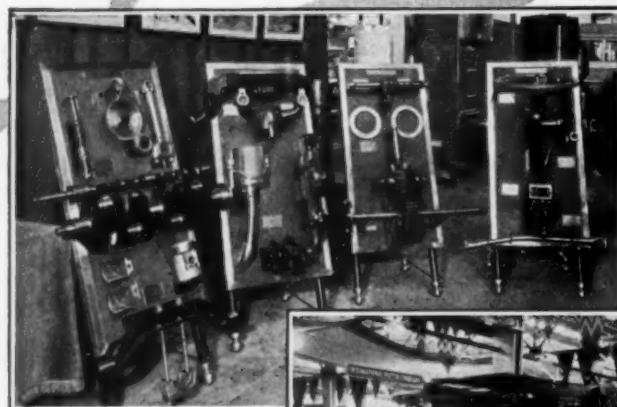
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Railway Age

Motor Transport Section
*Devoted to the
Co-ordination of Railway and Highway Service*



Vol. 83, No. 26

December 24, 1927

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"Motor Bus" or "Motor Coach"?

FOR a number of years the term "motor bus" was the only one used to describe passenger vehicles of large capacity operating on the highways, except in the West where the term "stage" has been more popular. Lately, however, the term "motor bus" has been looked upon with increasing disfavor, particularly among the larger railway operators of such equipment and certain of the manufacturers. The New England Transportation Company, the largest railway operator of motor coaches, is a good example of a company which makes use of the term "motor coach" to the exclusion of any other. Some of the principal manufacturers of motor equipment have also placed a taboo upon the "bus" terminology. The feeling among these advocates of the newer term, "motor coach," is that "motor bus" savors too much of the past when a motor bus was nothing more than a motor truck fitted up with seats for passengers. They contend that the modern vehicle, designed and built from beginning to end for the completely comfortable transportation of passengers and rivaling the most expensive automobiles in its luxury, deserves a better name than "motor bus" and that the better name is "motor coach." Incidentally, it is worth noting that the newly organized Motor Transport Division of the American Railway Association has, not a "Motor Bus Section," but a "Motor Coach Section." We believe that the relegation of the term "motor bus" to the scrap-heap and the exclusive use of the term "motor coach" will be a good thing, as fitting in its way as the replacement of the ancient, hard riding motor bus with the modern motor coach. Beginning with the January 28 *Motor Transport Section*, therefore, we propose to use the term "motor coach" exclusively in our editorial columns. We will appreciate comments from our readers telling us what they think of this plan.

Railway or Independent— Which Should Be Favored?

IN a recent decision of the Vermont Public Service Commission an electric railway was denied the right to operate a coach line paralleling its rail route, and the authority was granted to an independent operator. The first bare facts make the case appear something like that of the Baltimore & Ohio in West Virginia in which the State Supreme Court held that the railroad and not the independent operator should receive the certificate. By a closer examination of the Vermont decision, however, facts come to light which place it in a different category. "The testimony was all one way to the effect that the service of the trolley line was inadequate. . . . The issue, therefore, resolves itself into the simple ques-

tion: which petitioner is best qualified to render an adequate bus service? On the record we are compelled to hold in favor of the independent operator." All of which seems to us to mean, combining the doctrine of the West Virginia decision with this one, that, while ordinarily an existing utility should be favored in the granting of certificates, the character of its previous service must be given some weight in determining its capacity for increased powers and responsibilities. The Vermont decision refers to a previous decision in which it said: "In matters of this kind and on the record of this case and of this company, we are of the opinion that service is of first importance and that considerations looking towards the protection of a transportation monopoly which has refused to render adequate service should not be accorded any great weight."

The Motor Coach in an Emergency

PROBABLY the most thoroughly grounded tradition in railroading is the determination of everyone to keep the line open to traffic in spite of disaster—accidents, floods, "acts of God and depredations of the public enemy." Every division has at least one man—a trainmaster, a roadmaster or a superintendent usually—who is expert in clearing the line after a derailment, or restoring service after a washout. One such man known to us used to be an expert in constructing shoo-flies. He could put in a shoo-fly where none but himself would believe it could be done and this skill alone reduced by hours the time the line was out of service following a derailment or a washout. No other form of organized transportation can claim a tradition of continuous service equal to that of the railroads. There is a truism to the effect that good workmen deserve good tools. In the recent New England floods, the Boston & Maine officers found in their hands a new tool, and it proved a valuable one in strengthening the tradition of minimum interruption to through railroad service. This new tool was the motor coach. By using it the road was able to provide through service of a sort over almost all of its lines immediately following the flood. Not only that, but by relying to a large extent on the motor coach for maintaining service the road was able to concentrate all its efforts on rehabilitation, which fact measurably reduced the time of complete restoration of railroad service. Moreover the motor coach was used to convey workmen to points inaccessible by rail and to permit some lines to be devoted entirely to the movement of freight. The highway vehicle quite plainly has proved itself capable of emergency uses of the greatest value—a not unimportant consideration for railroads still debating its availability as an adjunct to rail service.

Motor Transport Division Meeting, Chicago, January 25-26

THE organization meeting of the new Motor Transport Division of the American Railway Association will be held in Chicago on January 25-26. Plans for this meeting are being made by a committee of railroad officers headed by A. P. Russell, vice-president of the New York, New Haven & Hartford and president of the New England Transportation Company. The work of the new division will be divided among three sections—one on the rail motor car, one on the highway motor coach and one on the motor truck. The activities of this division promise to be of the greatest importance toward the securing of greater efficiency and better service on the railroads. Furthermore there is scarcely a department on the railroad which will not be touched upon by the work of the division—the mechanical, operating, traffic and accounting probably being those principally concerned. The Chicago meeting, therefore, should be well attended, since each railroad, and several departments of each railroad, are concerned in its work and can derive profit from its discussions and deliberations. One railroad officer, a veteran attender of meetings and conventions, remarked of the new division's predecessor, the Railroad Motor Transport Conference, that he had never seen such earnestness and hard work as that which characterized its meetings. There is no question but that the Railroad Motor Transport Division will maintain this precedent.

More Attention to Be Given To Coach Operating Costs

INQUIRIES recently sent out by the *Railway Age* to its readers asking for their comments and suggestions on the contents of the *Motor Transport Section* brought in numerous requests for the publication of articles showing the operating costs of the coaches operated by the railways. The article in this issue entitled "Rutland Coaches Cost Twenty-seven Cents Per Mile" is the first answer to such requests. Similar articles describing the operating costs of the coaches of other railway operators will be published regularly in the *Motor Transport Section* in the future. Many factors, of course, affect the operating costs of coaches greatly. One of the principal ones is the physical characteristics of the territory served by the coach line. On the other hand, methods of operation and maintenance also vitally affect operating costs, and this is a ground upon which railway coach operators of every locality can meet on a common footing. One railway coach company will use one plan of operation, while another may use a more or less different plan. One company will adhere to one method of maintaining its vehicles, while another will adopt a quite different procedure. Experience alone will furnish the proof as to which plan of operation or which plan of maintenance is the better, and such experience will be clearly defined in the resulting operating costs. The trading of experience with operating costs of the railway coach companies should have but one effect: the most efficient operation of railway coaches possible. In this connection, mention might be made of the need for greater uniformity among the railway coach companies in their analyses of their operating costs. Some companies charge a certain item of expense to one account while others charge it to a totally different account. Worth-while comparisons can be made only if the systems of cost accounting used are

uniform. The classification of accounts developed by the American Electric Railway Accountants' Association and approved by the National Association of Railway and Utilities Commissioners, which was described in the *Motor Transport Section* of November 27, 1926, is well adapted to the use of railway coach companies and is considered worthy of general adoption.

The West Virginia Decision

THE decision of the Supreme Court of West Virginia, which held in a case involving the Baltimore & Ohio, that railways have prior rights to furnish highway service between points served by their rails, is viewed with considerable alarm by Arthur M. Hill, president of the Blue & Gray Lines, Charleston, W. Va., a so-called "independent operator," and chairman of the Motor Bus Division of the American Automobile Association in an address, entitled "Tomorrow's Motor Coach Legislation," which is abstracted in this issue. He intimated there that the fight of the Baltimore & Ohio in the West Virginia case to secure the right to furnish highway service demanded by its patrons was evidence of a "distinct effort being made upon the part of antagonists of motor coach development to obtain court interpretations of existing laws, which will practically prohibit coach operations by others than the owners of the older means of transportation."

Mr. Hill deplores the Supreme Court decision, contending that it gives inherent rights to the state highways to rail lines which have had no part and have paid no money toward the building and maintaining of these highways. "The highways of West Virginia have not been built by direct taxation," says Mr. Hill, "but through the use of funds obtained by the bond issue, plus the license and gasoline taxes for motor vehicles, the interest and sinking fund upon the road bond issue being cared for from the same source." This being the case the railways, purely from a standpoint of a contributor to the West Virginia roads, have no stronger right to them than anyone else, but, on the other hand, they have fully as much right to the use of the highways as anyone else.

The really important issue in this case was whether or not public utilities should be given reasonable protection from detrimental competition, and the Supreme Court ruled that they should be given such protection. In its decision the Supreme Court took note of the fact that the Baltimore & Ohio made no claim to exclusive charter right or legal priority of right to pre-empt motor coach service on the highways. Instead it merely contended that the railways perform vital services and must be preserved; that the railways have large investments and need all the income available under present conditions to insure an adequate return upon them; that competitive motor coach companies which would divert travel from the railways would reduce their revenues, resulting either in the impairment of railway service or the necessity of increasing rates; that these contingencies may be avoided by permitting the railways to render motor coach service; that because of their greater resources the railways can afford greater security to the public in performing highway service; and that the interest of the public will, therefore, be better served by giving the railways the preference over other applicants for certificates.

The West Virginia Supreme Court approved this position, and it seems to be sound as a matter of public policy.

Motor Coach Valuable Asset in Emergency

Boston & Maine finds traffic many uses for vehicle in keeping moving after flood



B. & M. Coach at Westminster, Vt.

THE utilization of motor coaches of the Boston and Maine Transportation Company to piece out the rail service of the railroad following the disastrous floods in New England on November 3-4 was dealt with briefly in the *Motor Transport Section* of November 26, page 1089.

Immediately following the flood, when divisional officers learned the extent to which through rail service had been impaired the thought of availing themselves of the facilities of the Transportation Company to bridge

when it is recalled that its lines were seriously damaged in 101 places and that a total of 946 miles of road—almost half the mileage—was affected. Two important main lines were out of commission at one or more points from 48 to 72 hours; less important main lines were without rail service for periods of 4 to 12 days; and some branch lines were tied up as long as three weeks.

Where railroad service was thus interfered with many passengers were enabled to continue their travel during the emergency by motor coaches used to bridge these gaps. Without the coach service through traffic would have been impossible. While it is true that New England highways suffered from the floods almost as badly as the railways, it is also true that where main highways were washed out it was in most cases possible to get through by detours over back roads, which offered a selection of alternate routes which rail lines do not have.

Some of the ways in which the motor coaches were utilized by the railroad were summarized by R. J. Littlefield, manager, motor coach service of the Boston & Maine Transportation Company, as follows:

Flexibility of Coach Great Asset

"Highway routes between certain points are more direct than the rail lines, particularly where the transportation requirements are what might be called of a spasmodic or cross country nature, and now we see the public benefitting because of the choice of routes possible over our New England highways with a form of transportation not bound to steel rails.

"For 60 hours, the only regular transportation possible north of Manchester, N. H., was via motor coach service over detours and back roads. These coaches connected with all trains to and from Manchester, providing service to Concord, Newport, Lebanon, N. H., White River Junction, Vt., and intermediate points.

"After the Dartmouth-Brown football game, the Dartmouth team moved the first hundred miles of its return journey, Providence to Manchester, by rail, and



Road Conditions Were Far from Ideal

gaps in rail lines immediately occurred to these officers and requests for this service came into railroad headquarters. It was soon learned that railroad resourcefulness in dealing with emergency conditions had in the motor coach a new and valuable tool.

The extent of the damage to the railroad will be realized

December 24, 1927

the last hundred by B. & M. motor coaches, stopping en route for dinner.

"As the water receded and repair forces pushed farther on to the less important lines, motor coach service followed, spreading out into the surrounding territory with a radius of 70 miles. Rail service was resumed to Newport, N. H., on November 7, where for three days a distributing point or railroad was established for the central western part of New Hampshire, and the central eastern part of Vermont.

Mail, Papers and Small Baggage Taken

"Highway service from here radiated north and south furnishing the only organized transportation into

Table 1—Emergency Motor Coach Routes

	Rail Distance Miles
Ayer, Mass., & Nashua, N. H.	18
Ayer, Mass., & Fitchburg, Mass.	14
Ayer, Mass., & Worcester, Mass.	28
Brattleboro, Vt., and Claremont Jct., N. H.	41
Concord, N. H., & Newport, N. H.	43
Concord, N. H., & White River Jct., Vt.	70
Manchester, N. H., & Concord, N. H.	18
Northampton, Mass., & Holyoke, Mass.	9
Plymouth, N. H., & Lincoln, N. H.	22
Woodsville, N. H., and White River Junction, Vt.	40
Total.....	303

Lebanon, Woodsville and Keene, N. H., and Brattleboro, White River Junction and Wells River, Vt., and

"Another phase of the motor coach operation during the flood period was the service furnished to replace passenger trains giving freight trains 'clear line.'

Giving Freight Trains Right of Way

"Over the Fitchburg division of Boston & Maine Railroad which extends from the Hudson river to Boston is routed the larger part of freight moving in and out of Boston and Central and Eastern New England to and from the West. This route was broken for 72 hours and thousands of freight cars accumulated—many containing foodstuffs and other high class freight. This important merchandise moved over 14 miles of single 'iron' normally double as well as through Hoosac Tunnel, and to speed up the movement, all first class trains between North Adams and Troy (48 miles by rail), New York, were cancelled, except two each way, which were heavy railway express trains; and a few trains between Troy and Johnsonville, N. Y., entirely out of the path of the freight movements.

Coaches Approximate Train Schedules

"Motor coaches and trucks operated between North Adams and Troy at first via Bennington, Vt., and later direct over the Mohawk Trail. The direct highway between North Adams and Troy being 10 miles shorter than the rail line, motor coaches made as good time as



Emergency Coach Route Between Brattleboro, Vt., and Claremont Jct., N. H., Where Rail Service Was Broken

intermediate points. Routes followed from this rail head were at right angles to the rail head instead of paralleling, and over these cross-country roads, double-headers were run on nearly every schedule, handling mail, papers, and small baggage in addition to the passenger traffic. Several hundred passengers were taken in and out of this temporary rail head until more rail lines could be restored. One of the routes in this territory which terminated at Woodsville, N. H., connected with a motor coach line operated by the Canadian Pacific between Woodsville, N. H., and St. Johnsbury, Vt.

"Highway service was furnished in place of trains while track and bridge repairs were being made on the routes shown in Table I.

local passenger trains. This is the line of the 'Minute Man' and special arrangements were made for motor coaches to transfer between Albany, N. Y., and Williamstown, Mass. Westbound through passengers were delivered to the New York Central at Albany from 30 minutes to 65 minutes behind the regular schedule of the 'Minute Man,' except on one night when the motor coaches were not available for prompt get-away from Williamstown. Eastbound through passengers from the West were quickly transferred at Albany from the 'Lake Shore Limited' to motor coaches, given an express run and delivered to the 'Minute Man' at Williamstown on time one night and other nights from 14 minutes to 48 minutes behind regular schedule. Eight parlor cars

(type Y Yellow Coaches) of the Boston & Maine Transportation Company, two parlor cars of the Albany Transit Company and two high speed trucks covered this passenger work between North Adams, Williamstown and Troy, handling several hundred passengers daily.

"In connection with the preferred movement to delayed freight the railroad also cancelled some through passenger trains between Boston and North Adams (142 miles), Boston and Greenfield (105 miles), Boston and Fitchburg (49 miles), and some local trains between Ayer and Fitchburg (14 miles), all of which were replaced by motor coaches. It was necessary to run

Boston, Mass., November 10, 1927.			
All Concerned:			
Effective Thursday, November 10th and continuing until further notice the following motor coach service will be operated over the highways between Plymouth and Lincoln, N.H. All classes of rail transportation will be honored. Coaches will stop at any point enroute on signal to the operator, to take or leave passengers. U.S. Mail and newspapers will be handled on coaches as far as space permits.			
WEEKDAYS			SUNDAYS ONLY
A.M.	P.M.		P.M.
Lv. Plymouth	9:45	4:20	12:45
Blair Village	10:05	4:40	1:05
Beebe River	10:20	4:55	1:20
Campton P.O.	10:30	5:05	1:30
W. Thornton P.O.	11:05	5:40	2:05
Woodstock P.O.	11:20	5:55	2:20
No. Woodstock P.O.	11:35	6:05	2:30
Ar. Lincoln Hotel	11:35	6:10	2:35
WEEKDAYS			SUNDAYS ONLY
A.M.	P.M.		A.M.
Lv. Lincoln Hotel	7:15	2:00	9:15
No. Woodstock P.O.	7:20	2:05	9:20
Woodstock P.O.	7:30	2:15	9:30
W. Thornton P.O.	7:45	2:30	9:45
Campton P.O.	8:20	3:05	10:20
Beebe River	8:30	3:15	10:30
Blair Village	8:45	3:30	10:45
Ar. Plymouth	9:05	3:50	11:05
	A.M.	P.M.	

R.J.Littlefield
Manager-Motor Coach Service

Many Such Mimeographed Bulletins Were Issued

'doubles' and 'triples' on some schedules to accommodate the train passengers.

"For the period November 9 to November 15 inclusive, 1075 train miles were cancelled each week day on the Fitchburg division and about 1600 miles of motor coach service operated. From November 16 to November 21, 543 passenger train miles were taken off and from November 22 to November 28 there was a cancellation of 420 train miles daily, practically all of which was replaced with highway service. All classes of rail tickets were honored. Hand baggage, papers and U. S. Mail were handled on motor coaches. Heavy baggage and express sent on following trains or by truck where no train service remained. Many train and engine crews were isolated and 'connecting motor coach links' enabled these crews to return to their home terminals and be available for other assignments. All railroad passes were honored on motor coach lines during this emergency.

Permit Peak Freight Movement of Road's History

"The eastbound freight movement from the western gateways of the B. & M. reached 1681 cars in 24 hours, ending midnight November 12, as against a previous record of 1237 cars during the congestion of March, 1920.

"Still another important use was found for motor coaches during the emergency. On account of so many breaks in the rail lines, train service could not be operated in some cases to handle the large repair forces necessary

and motor coaches were assigned to the maintenance-of-way and engineering departments for transferring men to and from temporary camps and from washout to washout. Linemen and many miles of wire were handled on the motor coaches. These cars served as lunch wagons, taking lunches to gangs from restaurants or camps 10 to 15 miles away.

Railroad Training of Value to Motor Organization

"A catastrophe which was the worst ever known in history of the New England railroads presented an opportunity to co-ordinate railway and highway transportation in a manner never before dreamed of, and demonstrated more fully the flexibility and adaptability of this new form of transportation. To operate over roads with which our men were not familiar; roads frequently covered with water and narrowed by washouts; roads with one-way temporary bridges of limited capacity, required minds alert every moment. The 'man at the wheel' trained under railroad organizations ready to work long hours in strange territory, never complaining, never losing sight of the importance of exercising extreme care was largely responsible for this important part played by the motor coach service. Supervisory men, mechanics, storekeepers, in fact every man in the organization was eager to get into the 'firing line' night and day, and help put this emergency service, totaling approximately 45,000 coach miles, 'over the top.' "

Rutland Coaches Cost Twenty-seven Cents a Mile

THE two motor coaches of the Rutland Transportation Corporation, the subsidiary of the Rutland Railroad, traversed a total of 35,247 miles of route during their first year's operation at an average cost of 27.29 cents per mile. An analysis of the operating expenses of these coaches is presented in a table included in this article. The figures represent the costs accruing during a period of slightly less than a year, covering the interval from September 20, 1926, when the Rutland coach operations began, to September 1, 1927. The total expense was divided by 12 to obtain the average per month, but since the period of operation lacks 20 days of being one year, the cost of operation per month as shown is not quite accurate. The motor coaches are type X Yellow manufactured by the Yellow Truck & Coach Manufacturing Company, Chicago. They have six-cylinder Knight engines and are equipped with balloon tires and fitted with Bender semi-de luxe bodies. They have seats for 20 passengers each.

As the schedule of the coaches calls for one round trip daily, except Sunday, between Bennington, Vt., and Chatham, N. Y., a distance of 67 miles by highway, only one is needed to protect the schedules on any one day. Under the plan of operation adopted by the Rutland the coaches are used on alternate days and the one not in service is inspected, cleaned and oiled on the idle day. This plan permits ample opportunity for a high standard of maintenance.

The operating conditions are fairly typical of those found in other parts of New England. The route traverses the Lebanon Valley and passes through rugged country of considerable scenic beauty which is not, however, unduly conducive to low operating costs. The highway followed by the coaches, when the present construction is completed, will be hard surfaced for the entire distance between Bennington and Chatham with the

exception of about four miles of good gravel road. The winter weather conditions, while severe, are not unusually so in comparison with other northern parts of the country. The roads are kept open during periods of heavy snowfall by the counties involved, which use their own snowplow equipment to plow the roads to their full width. The Rutland coaches make eight stops at towns along their route.

Operating Expenses Analyzed

Under the head of wages in the analysis of operating expenses, the Rutland includes the wages of the

Rutland Transportation Corporation Analysis of Operating Expenses (September 20, 1926, to September 1, 1927)			Average
	Total	Per month	Per mile (cents)
Wages:			
Operator	\$1,532.01	\$127.67	4.34
Maintenance:			
Labor	1,514.70	126.22	4.29
Supplies for repairs.....	584.84	48.74	1.66
Supplies	139.84	11.65	.40
	\$2,239.38	\$186.61	6.35
Gasoline	1,126.22	93.85	3.20
Lubrication	141.60	11.80	.40
Rent:			
Garage—Bennington	600.00	50.00	1.70
B. & A. station—Chatham.....	150.00	12.50	.43
	\$750.00	\$62.50	2.13
Tire reserve.....	533.97	44.49	1.51
Depreciation	1,292.06	107.67	3.67
Insurance	1,094.91	91.24	3.11
Taxes	648.24	54.02	1.84
Miscellaneous	260.58	21.71	.74
Total.....	\$9,618.97	\$801.56	27.29

operator, which were \$1,532.01 during the period from September 20, 1926 to September 1, 1927, or 4.34 cents per mile. No charge is made in the operating expenses for salaries of officers of the Rutland Transportation Corporation or of general employees or their expenses, since the administrative work is carried on by the regular officers of the Rutland Railroad, the salaries and expenses of themselves and their clerical forces being absorbed by the railway.

The total expenses for maintenance, including labor costs, cost of supplies for repairs, and cost of supplies, were \$2,238.38, or 6.35 cents per coach mile. The coaches are maintained at Bennington by the mechanical department forces of the Rutland Railroad, and this work is performed by them without detriment to their railway duties. The labor expense included in the coach operating cost analysis under repairs and maintenance, includes only the actual time consumed by these employees in this work. The railway assumes all idle time of the joint forces and also all supervision charges except the traveling expense of supervisors when they are away from their headquarters on the business of the transportation company.

The gasoline and lubrication expenses, as indicated in the tabulation, were \$1,126.22 and \$141.60, or 3.2 cents and 0.4 cents per mile, respectively.

Under the heading of rent in the analysis is charged \$750, or 2.13 cents per coach mile. This includes the charge of \$600 for the garage and \$150 for the use by the coaches of the Boston & Albany passenger station at Chatham, N. Y. The garage facilities at Bennington are rented from a public garage where the coaches are housed. The rental charge paid by the Rutland is \$20 per month per coach during warm weather and \$30 per month per coach during the seasons of the year when artificial heat is required in the garage. This rental

charge includes light, water, washstand, tools, etc., for the use of the Rutland employees engaged in the care and maintenance of the coaches.

The Rutland does not rent its tires, as do most of the other railway coach operating companies, but purchases them outright. The operating expense analysis indicates that \$533.97 was set aside as the tire reserve during the first year of operation, this being based on an accrued charge of 1.51 cents per coach mile.

Depreciation charges during the first year of operation were \$1,292.06, or 3.67 cents per coach mile. The coaches are depreciated on a percentage basis, based on a life for the buses of 200,000 serviceable miles. Since each coach is operated approximately 20,000 miles per year, the Rutland is using a depreciation rate of 10 per cent. On account of the limited traffic handled and its non-competitive local nature, the management does not feel that obsolescence needs to be taken into consideration in depreciating its coaches.

The cost of insurance charged against the Rutland coaches, during their first year, was \$1,094.91, or 3.11 cents per coach mile. The Rutland carries \$20,000 to \$200,000 liability, \$2,000 property damage, and complete fire loss protection. The policies provide for the operation of one coach at the premium indicated, although both may be operated when necessary to protect the service or for test purposes, and when so operated, protection is afforded on a pro rated basis.

The taxes, amounting to \$648.24, or 1.84 cents per coach mile, include the registration of the coach in both states, New York and Vermont, in which they operate, franchise taxes, etc. Under the heading of miscellaneous expenses, amounting to \$260.58, or 0.74 cents per coach mile, are traffic costs, consisting mainly of the cost of printing timetables, the traveling expenses of supervisors, and similar minor charges.



A Mack in Service on Portland-Pendleton Line of the Union Pacific Stages

Maintaining Baltimore & Ohio New York Coaches

*The fleet is serviced by the Fifth Avenue Coach Company
which uses the unit system of repairs*

Part II*

WHILE the attendants are supplying gasoline, oil and water to the motor coaches, the driver with the help of the assistant foreman of the garage, who is the official inspector, makes a general inspection of the motor coach, paying particular attention to the steering gear and levers, the springs and the brakes. For this work the driver is paid. The result of

It is also recorded on the form reproduced in Fig. 10. These data serve as a guide to the specialized mechanics. No mechanical work is done at night except by the road mechanics, who remain on duty as long as any vehicles are in operation. The man who makes a repair signs the sheet opposite the item on which he has worked. He also reports the actual trouble and the work done, because this is frequently at variance with the diagnosis of the fault as reported by the inspector and the driver.

Besides the inspection made by the drivers and the inspectors, a weekly inspection and report are made on each major unit, such as (a) the rear axle, (b) the engine, (c) the clutch, (d) the body, (e) the front axle and steering levers, (f) the transmission and (g) the propeller-shafts. This work is done by the assistant night foreman, who is the official inspector and is relieved or assisted by

Fig. 8—Front of the Coach Report Card

the inspection, as well as any trouble experienced during the day's operation is recorded by the driver on the coach report card. Both sides of this card are shown, the front in Fig. 8 and the back in Fig. 9.

The information on the cards is summarized and used by the garage day foreman for checking the work done.

Fig. 9—Back of the Coach Report Card

the road mechanic, the inspection being made after the motor coaches have been stored in the garage.

All records on the form reproduced in Figs. 9 and 10 for each particular motor coach are sent to the division clerk, who tabulates the information on the drivers' report and general overhaul sheet illustrated in Fig. 11. This sheet covers the entire performance of the motor coach for approximately 2,500 miles, after which the coach is held in the shop for about five hours to undergo a general overhauling. Complete inspection is made as outlined on the sheet, each mechanic, after doing his part, signing his name in the section that applies to his work. The whole record is checked and finally signed by the garage foreman, and is filed in the research department for future use.

The Night Force

The organization of a night force is just as important as is that of the day force. Each motor coach is thoroughly swept out and its windows, brasswork and hand-rails cleaned. After rainy days, the mud splashes are washed from the wheels and the lower portions of the body, but during fair weather, a schedule is arranged that will pro-

*Part I of this article appeared in the Motor Transport Section of November 26, page 1073.

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vide for wet washing both inside and outside every few days. As this schedule calls for the washing of some motor coaches in each division every night, the designated motor coaches are put into certain locations by the placer, after the driver has left the vehicle at the gasoline-filling and inspection station. At the end of the night's work,

the foreman inspects these motor coaches and checks them on a master sheet that records the number of each coach and the date on which it was last washed. The dry cleaning work, such as sweeping the floors and cleaning the windows and brasswork, is inspected by the assistant night foreman every half-hour, the night force being

Fig. 10—Report of Coaches Booked for Repairs

FIFTH AVENUE COACH COMPANY DRIVERS REPORT AND GENERAL OVERHAUL SHEET FOR BUS NO. _____ TYPE _____										
BADGE NO.	NAME OF REGULAR DRIVER				DATE IN	DATE OUT				
INSPECTION		DATE	DRIVER NO.	MILEAGE	GAL. OIL GAS USED	M. P. G. GAS	PORTS OIL	REPORTS—VOLUNTARY STOPS IN RED		REPAIRED BY
ENGINE, SUB-FRAME, STARTING HANDLE AND BONNET										
1.	Run engine—see that there are no apparent oil-leaks; that engine and sub-frame hold down bolts are tight; that exhaust joints do not blow and that flexible exhaust piping is in good condition and properly secured; examine engine for knock; clean crank chamber; examine compression; No. 1—16.0; No. 2—16.0; No. 3—16.0; cylinder.									
2.	Clean carburetor and spark plug; examine generator gear and thermostat rod.									
3.	Clean magneto. Examine leads, clip, tube and coupling.									
4.	Clean and examine generator. Also voltage regulator and cut-out.									
5.	Examine oil tank; clean gas filter. Examine gas pipe unions and rubber hose connection.									
6.	Test coil and examine distributor, head and contact points.									
7.	Examine alternator, fan, fan bracket, bolts, bearing, belt and bonnet.									
8.	Examine front wheel bearing.									
9.	Examine starting handle for rattling, nuts bushes, jaw, and brackets.									
10.	Examine front board; bonnet sills, and dash. See that all screws are firmly set in wood.									
11.	Clean carbon from exhaust ports. See that flexible hose connection is replaced securely.									
12.	Examine front license plate for rattling.									
CLUTCH OPERATING GEAR, GEAR AND COUPLING										
1.	Examining clutch operating gear, thrust race finger, clutch shaft bushes, coupling, coupling cover, coupling flange bolts; see that coupling flanges are tight on keys.									
2.	See that there is not too much end play in coupling shaft.									
GEAR BOX, FOOT BRAKE AND CHANGE SPEED GEAR										
1.	Examine gears and bearings for wear; see that gear box is in line; that holding down bolts are tight; that gears are meshing properly.									
2.	See that there is sufficient clearance in gate.									
3.	See that change speed slides freely through gate and that the bushings are not suddenly worn.									
REAR AXLE, WHEELS, SPRINGS AND REAR BRAKES										
1.	Examine rear spring, spring brackets, holding down bolts, king bolts, shackles and shackle-bolts. See that springs have sufficient camber.									
2.	Examine wheel hub assembly; see that wheel numbers are readable; that the numbers are rounded; that there are no bad cracks in spokes; that there are no stones between rear tires; and that all cuts are free from foreign substances.									
3.	Examine rear axle shafts for possible defects. Examine shaft bearings; test wheel bearing; see that there is no lift on worm shaft and that carrier bolts are tight; also see for oil leakage.									
4.	When renewing brakes, see that there is no undue wear in brake cam bushings; that brake drums are in good condition. See that brake drum bolts are tight. When replacing wheels, be sure they are tight on tapers.									
FRONT AXLE, STEERING, AND FRONT SPRINGS										
1.	Examine front springs, spring brackets, holding down bolts, king bolts, shackles and shackle bolts. See that springs have sufficient camber.									
2.	See that wheel numbers are readable; that wheels are in line; and that point work is in good order.									
3.	See that front wheel hub, nuts, and washers are in good order; that nuts are securely fastened; that pivot pins fit well, and that threaded ends are not worn.									
4.	See that steering wheel has no buckles; that steering column bracket is tight in steering frame; that steering lever on steering gear is tight on square; that steering bolts, springs and nuts are in good order; that cross tube has no lift; and that cross tube levers are tight in tapers and that all important nuts are passed.									
BODY, DESTINATION SIGNS, HEAT PIPES AND SCREENS										
1.	Clean body pipes.									
2.	See that body and cushions are thoroughly cleaned; body examined for projecting points likely to injure passengers or damage clothing; roof paint work cleaned; roof examined for leaks; areas inspected for rust inspection made; exterior paint repaired; see that body panels are firmly secured to floor, and that there are no loose or missing screws.									
3.	See that all body and body parts are in good working order and that body is in good condition.									
4.	Examine glass switches, wiring and fire extinguisher.									
5.	Examine head sign screws; see that there are no loose sections. Examine silhouette and exhaust connections.									
6.	See that sign and operating mechanism is in good working order.									
7.	See that all interior parts are in good condition. See that stairway signs are tight.									
8.	See that all inside advertising signs are clean and in good condition. Examine deck advertising signs for possible loosening. See that upper deck wire connections are secure; that all deck seats are in good working order under advertising are true from rapids. Examine upper deck seats for general loosening; see that there is clearance between seats and hand rails.									
GREASING AND OILING										
1.	GENERAL—Grease oil in crank case; use engine oil.									
2.	GEAR BOX—Fill with engine oil; use gear oil.									
3.	REAR AXLE HOUSING—Fill to within $\frac{1}{2}$ inch of top of filler; use gear oil.									
4.	Oil universal joints between gear box and rear axle; use gear oil.									
5.	Grease steering bearings, thrust races, and coupling shaft; use cup grease.									
6.	Grease steering casting, pivot pins, and tie rod bushings; use gear oil.									
7.	Grease front wheel; use cup grease.									
8.	Grease front and rear spindle pins; use gear oil.									
9.	Grease starting handle; use gear oil.									
NOTE—FOR WEEK ENDING _____ DIVISION. TYPE _____ GASOLINE AND OIL AVERAGES ARE _____ AND _____ M.P.G. RESPECTIVELY. BUS. _____ IS THEREFORE _____ % THE AVERAGE ON GASOLINE AND _____ % THE AVERAGE ON OIL.										
GENERAL REMARKS:										
I am satisfied that a thorough examination of the above vehicle has been made, that all defects have been remedied and that bus is in good running order.										
Signed _____ Date _____										
_____ GARRET FOREMAN										

Fig. 11—Driver's Report and General Overhaul Sheet

Fig. 12—Gasoline Issue and Consumption Sheet

divided into gangs, to each of which are allocated a number of coaches, on which they always work.

Gasoline Consumption

Because of the large expenditure for gasoline, a close check is made on both receipts and disbursements of

the difference is compared with the receipt given to the oil company's representative.

The quantity of gasoline in the tanks is measured at

FIFTH AVENUE COACH COMPANY SUMMARY OF GASOLINE CONSUMPTION MARCH 1937					
ASSESSMENT OF COACHES	No. 1 Gasoline 115 oct. No.	No. 1 Gasoline 115 oct. No.	No. 4 Gasoline 115 oct. No.	No. 2 Gasoline 115 oct. No.	
The Week					
Last Year					
NO. OF COACHES OPERATED					
The Week					
Last Year					
"A" Type The Week					
Last Year					
"C" Type The Week					
Last Year					
"B" Type The Week					
Last Year					
"D" Type The Week					
Last Year					
"E" Type The Week					
Last Year					
The Week					
Last Year					
MILES OPERATED	The Week				
Last Year					
GASOLINE CONSUMED	The Week				
Last Year					
TOTAL AVERAGE	"A" Type The Week				
Last Year					
"C" Type The Week					
Last Year					
"B" Type The Week					
Last Year					
"D" Type The Week					
Last Year					
"E" Type The Week					
Last Year					
The Week					
Last Year					
UNIVERSAL TYPE AVERAGE	"H" Type Highest				
Highest					
Lower					
Second Lowest					
"V" Type Highest					
Highest					
Lower					
Second Lowest					
"B" Type Highest					
Highest					
Lower					
Second Lowest					
"D" Type Highest					
Highest					
Lower					
Second Lowest					
"C" Type Highest					
Highest					
Second Highest					
Lower					
Second Lowest					
"E" Type Highest					
Highest					
Second Highest					
Lower					
Second Lowest					
CARAGE CAR AVERAGE	The Week				
Last Year					
REMARKS					

Fig. 13—Weekly Summary of Gasoline Consumption

gasoline. The main gasoline-storage tanks are designed so that a quantitative reading can be obtained. Measurements of the quantity of gasoline in the tanks before and after the oil company has delivered a load is made and

Fig. 14—A Record of Telephone Calls Received From Operators

the end of each day, after all the disbursements have been made, and the difference between this reading and the reading made after the delivery of gasoline from the source is compared with the total amount of gasoline

FIFTH AVENUE COACH COMPANY		
ROAD MECHANICS REPORT		
DATE _____	19_____	DIVISION _____
BUS NO. _____	DRIVER _____	BADGE _____
TIME NOTIFIED _____	AT _____	BY _____
TIME LEFT GARAGE _____	DESTINATION _____	TIME REACHED _____
NATURE OF TROUBLE _____ _____ _____		
TIME STARTED REPAIRS _____	TIME FINISHED REPAIRS _____	THE BUS CONTINUED OPERATION _____
REPAIRS MADE _____		
COULD DRIVER HAVE MADE REPAIRS? _____		
DID DRIVER MAKE ANY REPAIRS? _____ WHAT DID DRIVER DO TO OVERCOME TROUBLE? _____		
TIME REPORTED BACK TO GARAGE _____		
THIS FORM MUST ONLY BE MADE OUT WHEN BUS IS STOPPED FOR MORE THAN 5 MINUTES		SIGNED _____
		ROAD MECHANIC

Fig. 15—Road Mechanic's Report

disbursed during the day. When gasoline is being continually delivered to vehicles in quantities of from 10 to 30 gal., minor discrepancies of fractional parts of a

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gallon frequently occur, the accumulation of which over a period of a week might amount to a large quantity.

To check the condition of the engine or the possible carelessness of a driver, a reading is made of the quantity of gasoline in the tank of each vehicle when it reaches the garage at night. This reading is placed on the sheet reproduced in Fig. 12, on which is recorded the quantity

FIFTH AVENUE COACH COMPANY			
INVESTIGATION OF INVOLUNTARY STOP			
Division	Date of Stop	Day	19
Driver's Name	Badge	Conductor's Name	Badge
Bus No.	Time	\$ M In.	\$ M Total
Time Garage Planned	\$ M Time Mechanic Arrived	\$ M Repair Finished	\$ M
Directions	Location		
Inspector on Post	Time he arrived		
Mechanic's Report			

Fig. 16—Investigation of Involuntary Stops

of gasoline in the tank after it had been filled on the previous night. The difference between these items gives the gasoline consumption for the day. By referring to the mileage record of the vehicle, the average miles per gallon can be calculated. A column is provided on this record for the gasoline issued on the road, so that the total amount of gasoline issued can be allocated to the mileage performed.

This may seem to entail a large amount of work and

engine and of the ability of the driver. A consistently good gasoline average invariably proves that the vehicle is in the hands of a competent, careful and conscientious driver and that the mechanism is in a state of efficiency that will reflect credit on the system of mechanical maintenance. For instance, if the cylinder-walls are worn, the pistons and the piston-rings need replacing, or the brakes bind, these facts will become evident through the poor record of gasoline consumption made by a vehicle in such condition. This is an item that cannot be neglected. To keep a close check on the gasoline-consumption records, the form illustrated in Fig. 13 is issued weekly.

Involuntary Delays

In spite of careful inspection and timely overhauls, involuntary delays occur through various causes. All telephone calls from the road are recorded on a special form, that is reproduced in Fig. 14. These serve as a check on the promptness of the mechanics in responding to the call and in remedying the defect. These delays are also recorded on the back of the driver's day card, shown in Fig. 9. When the involuntary delay is of longer duration than 5 min., the mechanic makes a report on the road mechanic's report, illustrated in Fig. 15. Depending upon the frequency or seriousness of the delay, an investigation is made jointly by the garage foreman and the transportation superintendents, who report on the form, the front of which is reproduced in Fig. 16. Spaces are provided on the back for recording the date and place of the investigation, those present and the conclusions reached or the recommendations made. This joint investigation allows further instruction of the driver or other action to avoid a repetition of the trouble.

Daily Delay Report

A daily summary of these stops is made and distributed to all officers and superintendents on the daily report of delays, which is shown in Fig. 17. In the column for remarks is given the cause of the trouble.

In addition to the daily summary of involuntary delays, comparative statements are made weekly and monthly of the causes of such delays, in which the responsibility for the delay in question is allocated either to the transportation or equipment departments, or to the quality of the material or the deficiency of the design. A close check of this summary, as compared with that of any previous period, will give a comparison of the efficiency of the organization.

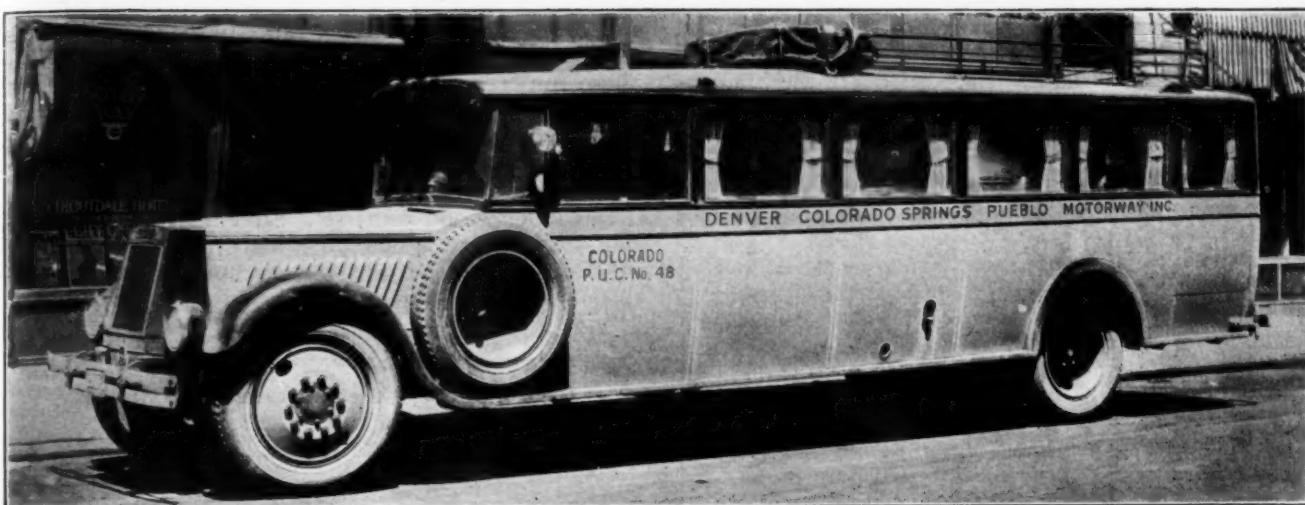
FIFTH AVENUE COACH COMPANY							
TRANSPORTATION DEPARTMENT							
DAILY REPORT OF DELAYS							
DAY	19						
MECHANICAL DELAYS							
DRV	MOS	TIME	MOS	LAST G.O.	REMARKS	T	W
				STREET	AVENUE	DATE	MILES
ACCIDENT DELAYS							
DRV	MOS	TIME	MOS	LAST G.O.	REMARKS		
				STREET	AVENUE		
REPAIR CODE							
If reported by Driver on road							
If reported by Driver at terminal							
If reported by Mechanic on road							
If reported by Mechanic at terminal							
Bus taken by Mechanic to terminal for repair							
Bus taken by Mechanic on road							
Bus has changed							
Summary of _____							
Reported with _____							
_____ 1927 1928 Inc. Dam %							
ACCIDENTS							
MECHANICAL DEFECTS							
COACH CHARGES							
TOTAL MINUTES LOST							
Mileage Dept.							
Signed _____							

Fig. 17—Daily Report of Delays

detail; and it must be admitted that the system must contain a certain number of vehicles in order that the economy obtained may be sufficient to justify its installation. Other advantages, however, are to be gained from keeping so close a record. The gasoline consumption of a motor vehicle is a true indication of the condition of the



A Seaboard (Motor Transportation Company) Coach in North Carolina



One of the Six-Cylinder Mack Denver-Pueblo Motor Coaches

D. & R. G. W. Operates on 500 Miles of Highway

Three subsidiaries serve eastern, central and western Colorado—Operations profitable

THE Denver & Rio Grande Western now operates 19 motor coaches and 9 trucks over a total of 500 miles of highways paralleling its railway lines in eastern, central and western Colorado. Three subsidiary companies carry on its highway operations, the Denver-Colorado Springs-Pueblo Motor Way, Inc., the Western Slope Motor Way, Inc., and the Rio Grande Motor Way, Inc. It uses its motor coaches and trucks to supplement as well as to replace its train-service and has found their operation profitable.

The Denver-Colorado Springs-Pueblo Motor Way, Inc., operates between Denver, Colorado Springs and Pueblo over highways paralleling the lines of the A. T. & S. F., the C. & S. and the D. & R. G. W. This company commenced operation on April 25, 1926, and has in service four 25-passenger, 4 cylinder, Mack motor coaches, and two 29-passenger, 6 cylinder, Mack parlor coaches. The summer service consists of four round trips daily between Denver and Pueblo, a distance of 119 miles. About half of the road is paved, and the balance is a well maintained gravel highway. Operations are confined to passenger service only.

The earnings of this company for the twelve months ended July 31, 1927, were as follows:

	Total	Per coach mile
Operating Revenues	\$76,225	25.2 cents
Operating Expenses & Taxes	67,339	22.3 "
Net Income	8,886	2.9 "

The net income represents a return of 14.8 per cent on the outstanding capital stock. Operating expenses include depreciation at the rate of five cents per coach mile.

Some of the operating statistics for the same period are:

Motor coach miles.....	302,216
Passengers carried	36,728
Passengers carried one mile.....	2,127,711
Average passenger per coach.....	7.1
Average revenue per passenger.....	\$2.01
Average revenue per passenger mile (cents).....	3.47

Schedules are arranged to supplement the rail service, in which there has been no change as a result of the inauguration of bus operations.

Operations in Western Colorado

The Western Slope Motor Way, Inc., began operation on May 31, 1926, between Grand Junction, Colo.,

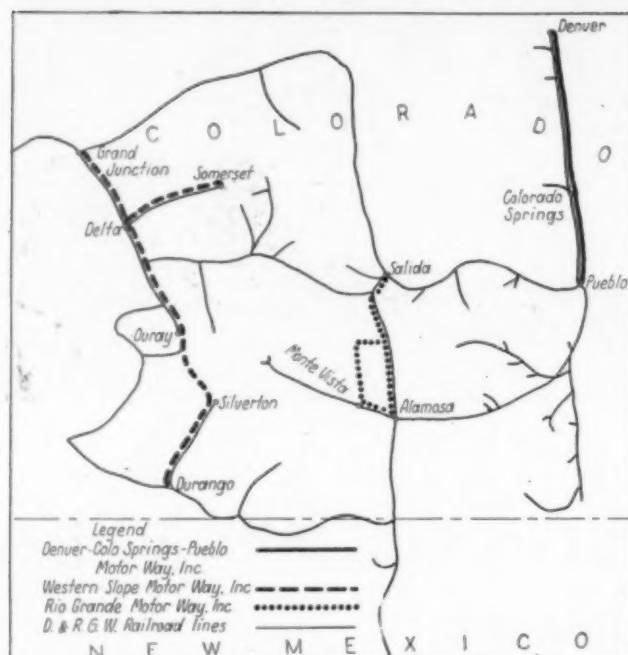


Rio Grande Motor Coaches Face Unusually Difficult Operating Conditions

and Montrose, a distance of 68 miles. The summer schedule provides for two daily round trips between Grand Junction and Montrose and one connecting

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round trip daily between Montrose and Durango, Colo., via Ouray and Silverton, a distance of 113 miles. The latter run is over the famous



D. & R. G. W. Motor Coach Lines in Colorado

scenic "Million Dollar Highway," which is considered one of the finest motor trips in America.

INCOME ACCOUNT AND STATISTICS—PASSENGER				
	Month of		Period Ended	
	This Year	Last Year	This Year	Last Year
Operating Revenue:				
Passenger				
Mail				
Package Freight				
Miscellaneous				
Total				
Operating Expenses and Taxes:				
Supervision and Overhead				
Supervision				
Advertising and solicitation				
Insurance				
Stationery and printing				
General expense				
Tax refunds				
Total				
Maintenance				
Repairs				
Tires and tubes				
Depreciation				
Total				
Transportation				
Drivers				
Gasoline				
Oil and grease				
Station employees and expenses				
Cleaning and oiling				
Garage and storage				
Total				
Total Operating Expenses and Taxes				
Net Income				
Statistics:				
Motor bus miles				
Passengers				
Passenger carried one mile				
Average passengers per bus				
Average revenue per passenger				
Average revenue per passenger mile (rounded)				
Revenues and Expenses Per Bus Mile:				
Operating Revenues—Total				
Operating Expenses				
Supervision and Overhead—Total				
Maintenance				
Repairs				
Tires and tubes				
Depreciation				
Total				
Transportation				
Drivers				
Gasoline				
Oil and grease				
Station employees and expenses				
Cleaning and oiling				
Garage and storage				
Total				
Total Operating Expenses and Taxes				
Net Income				

Monthly Passenger Traffic Report Form

The Grand Junction-Montrose Line supplements steam train service, while the run to Durango is between points

not now directly connected by rail. In the winter months weather conditions force the abandonment of the Durango run.

In addition to these runs, during about nine months of the year motor coach service is provided between Delta, Colo., and Somerset, a distance of 43 miles, permitting the discontinuance of daily passenger service between Grand Junction and Somerset. Street coaches were operated for a short period in Grand Junction in lieu of street car service, but this was discontinued as unprofitable. Truck lines are also operated in the same terri-

MOTOR WAY, INC. INCOME ACCOUNT, BALANCE SHEET, AND STATISTICS				
Month of _____		and _____ Months Ended _____		
INCOME ACCOUNT	Month of _____	Period Ended _____	Period Ended _____	
	This Year	Last Year	This Year	Last Year
Operating Revenues				
Operating Expenses and Taxes				
Net Income				
 BALANCE SHEET 				
As of _____				
	This Year	Last Year		
Assets				
Investment in Equipment				
Other Investments:				
Cash:				
In Treasury				
In Transit				
Balances Receivable from Agents				
Miscellaneous Accounts Receivable:				
 Current Assets				
Inventory and Supplies				
Insurance Premium Paid in Advance				
 Total Assets				
Liabilities				
Capital Stock				
Miscellaneous Amounts Payable:				
Vouchers				
Advances				
 Accrued Liabilities				
Accrued Depreciation:				
Freight Equipment				
Passenger Equipment				
Accrued Taxes				
 Corporate Surplus—Profit and Loss Balance: \$7461				

Monthly Report Form Prepared by Subsidiaries Through Which Check on Operations Is Maintained

tory, handling l.c.l. freight and, between certain points, U. S. mail.

The equipment owned by the Western Slope Motor Way, Inc., is as follows:

2 7-passenger Buick coaches	4 3-ton International trucks
4 12-passenger Buick coaches	1 1½-ton Graham truck
2 16-passenger Buick coaches	

The Western Slope Motor Way, Inc., earnings for the twelve months ended July 31, 1927, were:

Operating revenues	\$72,442
Operating expenses and taxes.....	65,713
Net income	6,729

The net income of \$6,729 is equivalent to 12.8 per cent on the outstanding capital stock.

Revenues and expenses per mile for the same period were:

	Passenger	Freight
(Excl. street motor coach operation)		
Operating revenues	24.4 cents	38.5 cents
Operating expenses and taxes.....	20.1	34.4
Net income	4.3	4.1

Both passenger and freight costs include depreciation at the rate of five cents per mile.

The principal operating statistics follow:

Passenger	
Motor coach miles (excl. street motor coach operation).....	183,533
Passengers carried.....	15,480
Passengers carried one mile.....	616,853
Average passengers per coach.....	3.4
Average revenue per passenger.....	\$2.19
Average revenue per passenger mile (cents).....	5.50
Freight	
Motor truck miles.....	67,148
Tons carried.....	2,513
Tons carried one mile.....	145,201
Average tons per truck.....	2.16
Average revenue per ton.....	\$10.30
Average revenue per ton mile (cents).....	17.8

Operations in Central Colorado

The Rio Grande Motor Way, Inc., operating in the San Luis Valley, commenced operations on April 15, 1927, with one round trip daily between Alamosa, Colo., and Salida, 85 miles, paralleling the narrow gage line of the Denver & Rio Grande Western eliminating

earnings and statistics are not representative, and are therefore of little value as yet.

Road conditions generally are favorable in all of these territories for year round operation, except between Durango and Montrose where the operations are suspended from about December 1 to June 1, the heavy snows in an altitude of more than 11,000 ft. rendering the highway impassable during the greater part of this period.

For the most part these coach lines use commercial garages for storage and maintenance under satisfactory contracts. One exception is at Grand Junction, where the Western Slope coaches and trucks are maintained in one of the D. & R. G. W. shop buildings.

Monthly Reports Rendered to D. & R. G. W.

Monthly reports of the operations of the motor transport subsidiaries of the D. & R. G. W. are made on forms such as those reproduced herewith. In addition to showing the results of the current period's operations, these forms are filled in also with information relative to the operations in the same period of the previous year. Items on these forms have to do with traffic, operations and operating expenses of all kinds, most of the statistics being reduced to a per-mile basis. The form entitled, "Income Account, Balance Sheet and Statistics," shows the amount of investment in equipment, materials and supplies and other items of a balance sheet nature. The income account figures for this report are taken from the more detailed reports of operations and traffic.

A New Series of Continental Coach Motors

THE Continental Motor Corporation, Detroit, Mich., is now in full production on a new series of 6-cylinder motor coach engines which include Models 8T, 16T and 15H. In general design, they resemble the 7T, 14T and 14H. They are identical as

INCOME ACCOUNT AND STATISTICS—FREIGHT				
	Month of		Period Ended	
	This Year	Last Year	This Year	Last Year
Operating Revenues:				
Freight				
Mail				
Miscellaneous				
Total				
Operating Expenses and Taxes:				
Supervision and Overhead				
Superintendence				
Advertising and solicitation				
Insurance				
Stationery and printing				
General expenses				
Tax interests				
Total				
Maintenance				
Repairs				
Tires and tubes				
Depreciation				
Total				
Transportation				
Drivers				
Gasoline				
Oil and grease				
Station employees and expenses				
Cleaning and oiling				
Garage and storage				
Total				
Total, Operating Expenses and Taxes				
Net Income:				
Statistics:				
Motor truck miles				
Tons				
Tons carried one mile				
Average tons per truck				
Average revenue per ton				
Average revenue per ton mile (cents)				
Revenues and Expenses per Truck Mile:				
Operating Revenues—Total				
Operating Expenses				
Supervision and Overhead—Total				
Maintenance				
Repairs				
Tires and tubes				
Depreciation				
Total				
Transportation				
Drivers				
Gasoline				
Oil and grease				
Station employees and expenses				
Cleaning and oiling				
Garage and storage				
Total				
Total, Operating Expenses and Taxes				
Net Income				

Freight Traffic Statistics Are Reported to the D. & R. G. W. by Its Subsidiaries on This Form

steam passenger service on it. It also runs one round trip daily between Alamosa and Salida, via Monte Vista, Saguache and Mineral Hot Springs, Colo., paralleling the D. & R. G. W. Creede branch between Alamosa and Monte Vista, the territory between Center and Mineral Hot Springs not being served by railroad. This line also handles U. S. mail between the points mentioned, in addition to regular l.c.l. freight service between all points. The equipment of the Rio Grande Motor Way, Inc., is as follows:

Passenger	Freight
1 18-passenger Buick coach	2 3-ton International trucks
1 12-passenger Reo coach	1 2-ton International truck
1 7-passenger Reo coach	1 2-ton Reo truck
1 9-passenger Reo coach	
1 7-passenger Nash coach	

As this line has operated only since April 15, 1927, the

Sectional View of the New Series of Continental Coach Engines

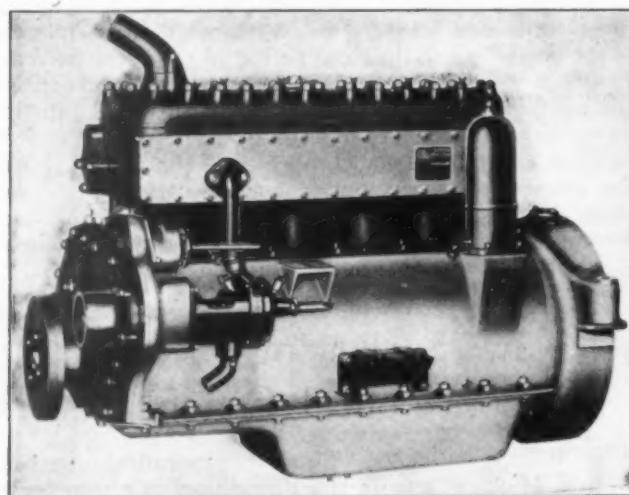
Sectional View of the New Series of Continental Coach Engines

to installation dimensions but include improvements in construction.

On motors of such large proportions, the reciprocating parts and crankshaft have considerable weight. Owing to the high speeds at which the motor is required to operate, the loads on the crankshaft bearings, due to

centrifugal forces, are very high. These forces are directly proportional to the centrifugal weights and to the square of the speed. One method for balancing these centrifugal forces is to employ properly designed counterweights. The new series of motors have the crankshafts machined to accommodate these counterweights. The weights are steel forgings which are attached to each crank cheek with three $\frac{1}{2}$ -in. bolts. The use of these counterweights serves to balance the centrifugal forces, thereby decreasing the effective bearing loads and the consequent wear on the bearings themselves.

Although centrifugal forces are responsible for the greatest per cent of bearing load, inertia forces are also a great factor in the life of crankshaft bearings. As these forces are directly proportional to the weight of the reciprocating parts, it is well to have these parts as light as possible. This may be done by using the Nelson type Bohnalite piston. This piston with its cast-in



Model 15H Motor, Showing the Water Pump and Oil Filter

steel struts is strong and extremely light. The use of this piston on the new coach series makes possible a further diminution of the bearing loads. The crankshafts are of the seven-bearing type like those on the old series. A vibration dampener is mounted on the front end of each crankshaft. This unit serves to smooth out and counteract the torsional vibrations which result from the tendency of the crankshaft to spring back or untwist.

Many large coach motors are hard to cool at high speeds. As a result the cylinder block has a tendency to crack between the exhaust valve and cylinder bore. The cylinder blocks designed for the new series of motors have a baffle cast between each pair of cylinders. This directs the cold water from the pump against the exhaust valves before it circulates around the cylinder barrels. In this manner, the hottest part of the engine receives the coldest water.

Nickel iron is now being used in the casting for the cylinder block and cylinder head. This gives a harder, finer texture and has higher wear resisting qualities than the ordinary type of casting.

It has been found advisable, on the new series, to make the flywheel housings of gray iron rather than of aluminum as formerly. This change gives greater rigidity which is desirable inasmuch as this part supports the rear end of the motor in the chassis frame.

Exhaust manifolds with flanges provided by which they can be bolted to the cylinder block are subject to considerable breakage. This is especially true where the manifold is very long as is the case on large motors.

The heat expands them and, although clearance holes are provided for the manifold studs, there are many cases where the flanges crack. The engines now in production utilize a crab manifold. This part is held in place by long studs and crabs which bear against the outside of the manifold.

Heat expansion has no effect on this design and the cracking trouble is eliminated.

Valve stems must stand the severest usage. The old type design utilizing a deep, narrow undercut near the bottom of the stem, for the accommodation of the horse-shoe lock, was frequently subject to breakage. The newer designs, such as are used on the new line of motors, have a tapered lock ring groove with split, tapered, locking retainers over which the conical steel spring retainer is fitted.

Timing gears are called upon to withstand a tremendous amount of wear. The softer materials, such as cast iron and low carbon steel do not last in this service. In the new series, heat-treated $3\frac{1}{2}$ per cent nickel steel gears with very broad faces are used.

The air compressor mounting and driving members are subject to considerable strain. The pulsating operation of the compressor unit is hard on the coupling which drives it. In the new designs, a double disc coupling is used with a pressed steel spider between the discs. This gives plenty of flexibility to absorb the pulsations and has shown exceptionally long life.

The bracket to which the compressor is attached has been greatly improved in the new designs. When operating at high pressure, occasions have been found where the bracket eventually failed owing to the continuous pulsations. To obviate this, a bracket with trunnion mounting for the air compressor has been designed for the new motors. The two trunnion supports are concentric with the compressor center line. This design makes possible better alignment and furnishes a secure support.

Oil filtrators of the Hall-Winslow type have been adopted on the new engines. This device is composed of an aluminum base with a pressed steel shell attached to it and covering the filtrator element which is composed of a series of felt discs held together by spring pressure. The oil enters the filtrator from the pump line, passes through the felt discs and into the central return tube which is drilled at several points. From thence the oil goes to the bearings. A by-pass valve is provided in case the filtrator is neglected and the felt allowed to become impregnated with dirt. The whole unit may be easily cleaned by attaching a tire pump hose to the connection at the top and blowing out the dirt and sludge from the felt discs. This sludge drops to the bottom where it is drawn off through the elbow connection provided for this purpose.



One of the B. & O.'s Centenary Exhibits—a Truck Used in Freight Service by a Railroad Subsidiary

The Motor Coach of the Future *

Severity of operating requirements setting up new standards—Some radical changes expected

By H. D. Church

Director of Engineering, the White Motor Company, Cleveland, Ohio

THE demands made upon the mechanism of the modern motor coach are probably more severe than those made upon any other piece of automotive mechanism. The engine is called upon to develop high torque at moderate crankshaft speeds, and must develop good torque at high crankshaft speeds. It is working a large part of the time at a fairly high percentage of its maximum output at any speed. It is called upon to operate for long periods at maximum power and speed when using the gears in the transmission, and in many installations it covers 100,000 miles a year under these conditions. In the same way all other chassis units are subjected to hard service.

The severity of the operating requirements is rapidly setting up new standards of engineering in motor coach design. Certain engineering practices which are perfectly safe on other types of vehicles have no place in a modern motor coach. It is probable that the engineering trend in this field will go through the same cycle as it has in other fields of automotive engineering. By that I mean that radical departures from what is now regarded as reasonably conventional practice will probably develop only gradually.

Design Determined by Requirements

In the last analysis, the design of any piece of mechanism is determined by operating requirements. A satisfactory motor coach design must be one which either earns or saves money for its operator. The most important developments in the immediate future will probably be in the direction of refining and improving present designs to give greater safety, greater passenger comfort, and last but not least, lower operating costs. There is plenty of room for improvement in the various chassis units to give the coach more miles on the road with fewer hours in the service station.

In the outline which follows, covering design trends in the various chassis units, it should be understood that the picture presented is merely a sketch of a composite vehicle. No one vehicle on the market today incorporates all the constructions which are mentioned. From an operating standpoint there will undoubtedly be criticism of some of the opinions expressed.

Greatest Improvement Expected in Engine

Considering the various chassis units, the engine, clutch and transmission are those in which the greatest improvement is to be expected in the near future. In the broadest sense, the engine design is determined to a large extent by the maximum torque requirements. The engine must have a number of cylinders which gives inherent balance, and the maximum torque requirements will be an important factor in determining how many cylinders are used.

With the present day fuels, a distinct limitation on the cylinder bore is imposed by the detonation characteristics of the fuel. A discussion of this phase of en-

gine design would take too much time, but considering the factors involved, it is not likely that cylinders of larger than 4½ in. diameter will be used, owing to difficulties with detonation and cooling of piston heads.

There is something to be said in favor of each of the three types of cylinder construction in use today: namely, the sleeve valve, L-head, and overhead valve types. The sleeve valve engine has an ideal form of combustion chamber and spark plug location, but is subject to lubrication difficulties and hot pistons. The L-head is the simplest construction which can be used, and, with a proper shape of combustion chamber and proper spark plug location, gives good results, but for the same detonation does not give as high mean effective pressure as the sleeve valve or the overhead valve type.

The conventional overhead valve engine has an ideal form of combustion chamber, but it is difficult to locate the spark plug near enough to the center of the charge. With proper ignition design, the overhead valve engine is like the sleeve valve engine in that it will give high mean effective pressure for a given detonation. The greatest objection to it is that more parts are required for valve actuation, and that unless the design is very carefully worked out there is a tendency toward noisy valves.

Engine Lubrication a Source of Trouble

The engine lubricating system is at the root of many troubles today. Full forced feed to all working parts is essential. Provision for properly cleaning the oil is desirable, and an oil cleaner which will continue to function without frequent service attention would be valuable. A simple design of oil cooler is desirable in order to maintain proper viscosity in hot weather, as the life of all the working parts of the engine is materially increased by keeping up the oil viscosity at all times.

A lubricating detail which should be given more attention in design is the elimination of oil leaks. An engine or chassis unit which is covered with dirt externally as a result of oil leaks, is hard to inspect for condition, and difficulties which may have developed are less likely to be discovered. Improvements in engine design as well as the lubricating systems will undoubtedly give much longer life to all the engine bearings.

Rigidity of Working Parts Important

The importance of rigidity on the life of the working parts can not be over-estimated. A sufficiently stiff crankcase and crankshaft design will go a long way toward the elimination of bearing troubles, and the attendant expense. Stiffness of the cylinder block and head is also important. A rigid single block of cylinders greatly helps in stiffening the crankcase. With the detachable cylinder heads almost universally used, the design should be such that the tightening of cylinder head studs does not distort the valve seats or guides.

Rapid progress is being made in exhaust valve cool-

* From an address before the Engineering section of the American Electric Railway Association at Cleveland, Ohio, on October 6.

ing, and this will greatly lengthen the periods between valve regrindings. Improvements in the induction system are coming which will give better distribution, higher mean effective pressures for the same detonation, and better economy with the present day low volatility fuels. All engine accessories, with the possible exception of the fan, should be positively driven through enclosed and automatically lubricated chains or gears.

Clutches will probably have lower unit pressures and better provision for heat dissipation in order to prolong the life of the facings. Some provision to insure a really soft and progressive engagement throughout the life of the facings is highly desirable, as it will save wear and tear on the entire driving train between the clutch and the rear wheels. It is probable that pedal pressures will be decreased in order to prevent driver fatigue. Transmission modifications are to be expected in the direction of easier gear shifting and greater silence in the geared speeds.

Chassis frames are being designed to give greater resistance to twisting, which should permit the use of lighter bodies without the sacrifice of body life. In this connection I think there are interesting possibilities in the development of light-weight bodies.

There is a strong trend toward greater accelerative ability to enable the coach to keep its place in modern traffic; by the same token better brakes are needed. I believe that metal to metal brakes on all four wheels, operated by compressed air or some other form of "servo" device will soon be considered indispensable. This construction utilizes the entire vehicle weight for braking traction, requires little muscular effort on the part of the driver, is excellent from a cooling standpoint, and its action is practically unaffected by oil, water, or grease on the braking surfaces.

Low Pressure Tires Recommended

The use of low pressure tires should become more general due to the demand for increased passenger comfort. In addition, there should be a distinct decrease in chassis depreciation when low pressure tires are used, due to the added cushioning effect which protects the entire chassis from minor road shocks. The more widespread acceptance of low pressure tires has probably been somewhat delayed by several causes. In the first place they have not as yet fully demonstrated their ability to give the same cost per mile as the high pressure tires. This is partly the result of undertiring or overloading, and partly because certain of the tire manufacturers have run into constructional difficulties in the larger sizes of low pressure tires. In addition, there is always more tendency toward front wheel shimmy with low pressure tires than with high pressure tires. Progress is being made in running down the causes of shimmy, and the solution will eventually be found. Low pressure tires have one other drawback in that they require a greater mechanical advantage in the steering gear. This is not a serious condition but is one which will have to be given attention.

There will probably be distinct improvements in chassis lubrication. The lubricating requirements of a motor coach chassis are exceptionally severe, due to the high mileage per day. Many of the points requiring lubrication are inaccessible located with the result that they are neglected, or else the time required to get at them is too great. The solution may be some form of central lubrication or thoroughly housed construction carrying a sufficient supply of lubricant for long periods of operations.

The question of riding qualities is also due for consideration. The variation in spring load between a part

passenger load and a full passenger load is great, and means should be provided to insure comfort under either condition.

Two very important items are body heating and ventilation. The exhaust gas heating system which has been extensively used in the past will probably be replaced by some system using water or air in order to eliminate, as far as possible the leakage of any exhaust gas into the body interior. Some satisfactory provision to give adequate body ventilation without draughts is also most desirable.

Several Radical Developments Seen

Considering for a moment the more radical design possibilities, there are several promising developments in sight. The double rear axle construction which has been used for the past few years, both in this country and abroad, is attractive from the standpoint of good riding qualities, less damage to road surfaces, and ability to carry the maximum loads on pneumatic tires within a limited overall width. This construction involves some difficulties in taking care of the torque reactions from the driving and braking loads. Unless a differential is used between the two axles, each one should be heavy enough to handle full torque requirements, which means extra weight and cost. Further developments are to be expected in this construction.

From the standpoint of traffic congestion, the present day motor coach probably represents the top limit on overall length. It is possible that future developments may result in a complete relocation of the various chassis units in an endeavor to obtain more seating capacity within the present overall length. The conventional location of the chassis units as now used has been developed in motor cars over a long period of time, and is the most satisfactory one we know of today. On the other hand, it is possible that some satisfactory new arrangement may be worked out which will utilize practically the entire length of the chassis for passengers. Any departure of this sort, however, will have to prove its worth in actual service as there are many questions of design and accessibility to be answered.

It is difficult to prophesy the future of motor coach design with any degree of accuracy. The rapid increase in motor coach use has brought about a specialized vehicle in such a short period of time that the engineering fraternity has found it difficult to keep pace with the operating requirements. It is safe to say, however, that the design of the motor coach of the future will be dictated primarily by the demand for safety, comfort, and reliability, and it is certain that with close co-operation between the motor coach operators and manufacturers, we can look forward to a constant improvement in design with an attendant reduction in operating costs.



A Victorian Railways Motor Coach

Economic Aspect of Hauling L. C. L. Freight by Motor Trucks*

Railroad terminal costs favor motor trucks for short distances—Co-ordination of effort essential

By F. J. Scarr

The Scarr Transportation Service, New York

TRANSPORTATION has advanced in economy and efficiency in proportion to the intelligent application of human ingenuity and capital investment. True advancement, however, is not in the development of any single phase to usurp in whole or in part the function to which any other phase is particularly adapted and better fitted to perform. A proper scheme of transportation demands that each means be employed in the task for which it is best suited.

President L. F. Loree of the Delaware & Hudson in his address before the Holland Society last year, discussed the advancement of transportation in a unique

tion. These results, together with those previously discussed, have been listed in Table 1 for convenient comparison. This is offered not as conclusive as to accurate detail, but as indicative to general relations.

Table 2—Productive Ability of the Individual

Part	Means of transportation	Tons of revenue freight per man per day	Miles hauled	Ton-miles per man per year (312 days)	Cost per ton-mile
I....	American railroads (All freight)	3.06	309	295,000	\$0.009
	American railroads (C. L. freight)	3.43	309	330,700	0.008
II....	American railroads (L. C. L. freight)	0.85	309 (?)	82,900	0.032
	5-ton truck ¹ (80 per cent load)	5.00	100	156,000	0.065
III....	5-ton truck (40 per cent load)	8.00	33	82,400	0.090
	American railroads (L. C. L. freight)	5.00	33	57,500	0.215
IV....	5-ton truck (80 per cent load)	16.00	10	55,900	0.115
	5-ton truck (40 per cent load)	10.00	10	31,200	0.250
	American railroads (L. C. L. freight)	....	10	....	0.490

¹Potential figures.

manner. He measured such advancement by the increased productivity of the individual as outlined in the following quotation, which—with Mr. Loree's permission—has been briefed:

The first transportation undertaken by man was a personal effort in which he packed his own burdens . . . Under this method there may be transported daily 65 lbs. 15 miles for each porter, or allowing 312 days for a year's work, 152 ton-miles.

With the domestication of wild beasts, pack trains were organized. . . . A horse of average force working for eight or ten hours per day might transport on his back 200 lbs. at a rate of 25 miles per day over average level country. For a year of 312 days his performance would be 780 ton-miles.

In the early eighteenth century . . . highways were built with careful attention to grades and their surfaces properly metaled. Many cartage companies were organized and an allowance of one ton of goods for one horse was very general. With this power, 20 miles a day were covered, or for a year of 312 days, 6,240 ton-miles. . . .

There were on the payrolls of the railroads of the United States at the end of 1925, 1,753,208 employees. Making a rather arbitrary division of these employees between freight and passenger service . . . indicates that there were approximately 1,415,000 employees engaged in freight service. In the year 1925 the railroads transported 452,827,593,844 net tons one mile. Comparing the extremes only, we have 152 ton-miles per year as the paying load-carrying capacity of the porter. The railroads in 1925 transported 320,019 (paying load) per individual freight employee. That is, the productivity of the individual due to the achievements of management, as reflected in the concerted movement and in the ordered discipline; the use of capital reflected in the plant, the provision of power, and the multitudinous inventions and adaptations of machinery and tools; and his own intelligent industry, has been multiplied 2,105 times.

For the purposes of this discussion, the productivity of the individual has been calculated when using the motor truck, the latest development of land transporta-

While it is recognized that the figures in Table 1 are not accurately comparable, there are certain general and interesting conclusions apparent which are adequately supported and justified.

It is interesting to note the distinct periods into which this table divides transportation development. These periods are clearly marked in the two columns captioned Ton-miles per year and Cost per ton-mile.

In the first period neither capital nor human ingenuity have been applied to an appreciable extent, with a minimum of individual ability and maximum cost as the result.

The second period finds the application of capital in the form of muscular power and the application of human ingenuity only to the extent of animal domestication. The result, however, is to increase individual productivity thirty-fold and reduce the cost by 20 per cent.

The third period is that of additional capital use and the first application of mechanical invention in the cart and dray. The result is again to increase productivity and reduce cost.

The final period seems to be the acme of development, as Mr. Loree points out in the last sentence from his address. Herein the supreme application of human ingenuity, in the development of mechanical power as well as greatly advanced auxiliary means, is made possible by the unstinted and intelligent application of capital in the form of railways and motor vehicles. This has resulted in increased individual productivity and reduced costs to a seemingly extreme degree.

It seems that the final period has been reached. Ad-

* An abstract of a paper contributed by the Railroad Division and presented at the annual meeting of the American Society of Mechanical Engineers, held at New York, December 5 to 8, 1927.

vance from the present state will be the result, principally of refinements of established principles and practices.

The railroad is supreme in its "mass transportation" ability. Economic law dictates its utilization to the greatest possible extent for the movement of that class of freight for which its equipment and facilities have been designed—in general, the movement of large volume for long distance.

As this discussion is primarily one of the motor truck and a portion of the railroad scheme, it is necessary to examine the general relation of these two means more specifically. Therefore the data in Table 1 have been extended into further arbitrary divisions, Table 2.

Less-than-carload traffic constitutes approximately 4 per cent of the total railroad freight business and requires nearly 20 per cent of the rolling equipment for transportation. Table 2 (Parts 1 and 2) indicates that the handling of L.C.L. freight costs four times that of carload freight. This is due, primarily, to high (L.C.L.) terminal costs and low average tonnage per employee.

The potential performance of the motor truck exceeds the individual productivity of the L.C.L. freight employee. The greater cost per ton-mile, however, presents the complete usurpation of this business by the motor truck, and indicates that for much of this class of freight the railroad must remain supreme.

High railroad terminal costs, due principally to the high platform-handling expense, cause a material change in this relation for the shorter distances.

At 33 miles, the economic point which the average railroad cost of handling L.C.L. traffic exceeds the revenue, the relation of the railroad and the motor truck is such as to favor the latter under good motor-trucking conditions and the former for average conditions.

At this distance, on the basis of cost alone, the railroad is superior to the 40-per-cent-factor motor truck,² while the 80-per-cent-load-factor vehicle³ is capable of serving at less cost than the railroad and will also reduce the time element to the minimum.

It is assumed that ten miles is the outside radius of the daily ability of the horsedrawn vehicle. This distance is well within the reach of the motor truck, which vehicle seems destined to play a middle role between the horse-drawn vehicle on the individual or retail side and the railroad on the mass or wholesale side. Dependable statistics indicated that, of the large and ever-increasing amount of traffic being handled over the highways, nearly 50 per cent is moved less than ten miles. At this distance, as indicated in Part IV of Table 2, the motor truck is eminently supreme, both in cost and expedition of movement.

Present Conditions at Variance with Economic Law

While economic law is certain to prevail, it is not as prompt of action as it is correct of judgment. Human effort to influence the functioning of this law is slow of adjustment to meet new developments. The cost of operation, while indicating the economic relation, is not a correct measure of the conditions which influence the flow of today's freight traffic. The cost to the shipper, involving arbitrarily fixed rates, and to a material extent the expedition of completing the through movement from door to door, are the chief factors affecting a choice of mode. These factors, considered in their true light, together with other related factors, present a vastly different picture of the present relation of rail and highway transportation.

No transportation is of value except as a part of the completed movement from point of origin to point of destination. That the shipper is also interested in the element of in-transit time is evidenced by changed business conditions and demands. The through movement and minimum costs, however, remain the shipper's prime interest.

In the movement of L.C.L. freight traffic the railroad performs, in general, but one portion of the completed movement. Some form of highway transportation accomplishes the collection and distribution. This condition is also true of a considerable portion of carload merchandise traffic.

The shipper is also burdened with the necessity of crating merchandise. That this item is of greater expense and weight when railroad movement is contemplated than when only highway transportation is involved, is well known.

Through Movement

The through movement from origin to destination involves, generally, three and four elements of expense when moved respectively by highway alone or by highway and rail. These factors are: crating, carting, freight on net, and freight on tare. These factors in combination determine the true relation of rail and highway transportation as dictated by today's conditions. Properly evaluating these elements of the completed movement indicates that the motor vehicle can successfully (and actual operations demonstrate) compete with the railroad handling of L.C.L. traffic for considerably greater distances than the accurate measure of economic law seems to dictate.

Today's conditions are not in accord with economic law. In spite of the human tendency to resist any change in the established order, the shortcomings of the present system will be overcome and the advantages offered by new measures will be pursued.

The motor vehicle is burdened with little terminal expense. The railroad, particularly in L.C.L. traffic, is tremendously taxed by high terminal costs—made up largely of handling expense. These characteristics are clearly demonstrated in the flat motor-vehicle and abruptly ascending L.C.L. cost curves for the shorter distances.

Co-ordination of Effort

These principal expense factors of the two modes of transportation under consideration can be bettered materially by mutually co-ordinated effort. In the matter of terminal expense the motor vehicle is reasonably free, that item being largely absorbed by the merchant, while the railroad pays from \$0.16 per net ton-mile (at 33 miles) to infinity, depending inversely upon the distance. In line-haul expense the motor vehicle is penalized a fairly constant sum of \$0.065 per net ton-mile, while the railroad does not exceed \$0.032.

Two conclusions result directly from the foregoing discussion:

1. To permit the utilization of railway transportation in the line haul and highway transportation in the terminal movement to the greatest possible extent demands that some efficient, economical, and rapid means of transfer from one medium to another be devised and placed in service.

2. To permit the application of a plan of mutual co-ordination between rail and highway transportation requires that present rate structures be revised to be as fully as possible in accord with the relative cost of operation of each mode.

² These percentage load factors are approximations of the average attainments of organized motor transport for "one-way" and "two-way" loads.



*The economic field of each, as developed
in the experience of the Boston & Maine*

By H. F. Fritch

Passenger Traffic Manager, Boston & Maine,
President, B. & M. Transportation Co.

ARRAILROAD has the right and the obligation to use the most efficient vehicle available to handle its traffic so long as it renders a reasonable service. This is regardless of whether the vehicle operates over its rails, over the highways or through the air. The railroad was for many years the only means of handling passengers and merchandise on land in volume with speed. The development of the internal-combustion engine and the simultaneous development of the highways has changed this condition. The private automobile has revolutionized the travel habit of people in the last 15 years and more especially in the last 10 years.

The diversion of a large volume of traffic from the railroad to the private automobile has forced the railroads to find cheaper means of caring for their traffic on lines where the volume of business has fallen off. It is economically unsound for a railroad to continue to operate with any other than the most efficient unit available. To do so is not for the good of the railroad or the community. To the railroad it means unnecessary operating expenses, and to the public depleted service; and eventually the unnecessarily high operating cost will have to be paid by the public.

The internal combustion engine has made possible two new units for handling the smaller volumes of traffic: The motor coach for highway use and the rail car for use on the railroad right-of-way. The contemporaneous development of these two vehicles results in interesting problems to determine which of the two may be used in each particular instance to the best advantage. There is a field for each and these fields seem to overlap. Each case under investigation must be decided on its own facts. It is impossible to lay down a hard and fast rule or formula by which all cases may be decided.

For the purposes of this paper, only the transportation of passengers and of classes of goods ordinarily transported on passenger trains will be considered. These are mail, newspapers, baggage, express and milk. I will point out some of the factors we have found in our experience on the Boston & Maine which should be considered in determining whether an operation should be converted to rail car or motor coach.

Changing Travel Habits

In studying this problem, one of the most important things is to be forward-looking and recognize that the automobile has changed travel habits and has an appeal to personal convenience which is very powerful, and that diminished service on branch lines facing such com-

Rail Car or Motor Coach?*



petition is very likely to result in further depletion of revenue. Furthermore, the advantages and limitations of both the rail car and the motor coach must be squarely recognized and their effect not only upon operating cost but upon traffic promotion reckoned with.

One of the fundamentals to determine is whether the continuation of a rail line is necessary or desirable for other traffic independent of the passenger requirements. If the passenger service alone must bear the burden of supporting the rail line where the traffic is light, the motor coach acquires quite an advantage over the rail car, as it may become possible to dispense with the privately supported rail line and use the publicly supported highway. On the other hand, if the maintenance of a rail line is desirable for the operation of freight service, the use of a public highway as compared with the private way is of no great importance and the two vehicles must be compared on a cost basis, disregarding maintenance or investment in way.

It has been argued that the operation of motor coaches in place of rail service will endanger the continuance of a rail line and hasten the day of its abandonment. This is not sound if there is any economic justification for the existence of the rail line at all. If, as is usually the case, there is a fairly substantial freight business on a branch line, and a light unprofitable passenger business, the reduction of the passenger loss as a result of going onto the highway will lessen rather than increase the danger of abandonment of the line.

Highways in the territory must be studied both with respect to their layout with reference to the communities to be served and also with respect to their character and capacity. Frequently the communities can be better served by highway than by rail, because of the closer proximity of the highway to the settled sections or the ability to detour a motor coach through the settled sections, while the path of the railroad is expensive to change and is more restricted as to curves and grades.

The character of highway surface and foundation is especially important in territory where the winter conditions are severe. The improvement of highways is one of the most remarkable things of our time of remarkable accomplishments. In the last few years great progress has been made in snow removal. It has been demonstrated that much more can be done along this line than was ever dreamed of a few years ago, and that the effect on the highway surface is beneficial rather than harmful as had been predicted. In New England, as I suppose elsewhere, while this opening of the highways in winter has made it possible to operate our motor coaches, it has deprived our transportation lines of substantial

*From a paper presented at the Transportation Meeting of the Society of Automotive Engineers in Chicago on October 26, 1927.

amounts of revenue by making it possible for the automobile to stay in service.

Development of Rail Car and Motor Coach

Consideration should be given to the state of development of the motor coach and the rail car, having in mind its effect on obsolescence, cost of maintenance and operation, and reliability of performance. The motor coach for general highway use has been a comparatively recent development from the motor truck. There are large numbers of them in operation but I feel that they have not as yet realized the same degree of development as the private automobile. Rail cars were being produced before the motor coach was being built for general highway use, but the production of the former practically ceased about ten years ago, only to be resumed with increased activity since the world war.

The real necessity for such a unit and the development of the gas-electric unit with throttle control of speed have been important factors in bringing this unit again into prominence. In the last four or five years great progress has been made but I would hesitate to say that its design has yet become stabilized. It appears to me that the tendency in rail car design since the motor coach has come into the field is toward larger and more powerful units than were first produced. Neither the motor coach nor the rail car has finished its period of development, but good serviceable units of each kind are being produced and operated.

The ordinary maximum capacity of a single deck motor coach today is 29. The capacity is limited to about this number in many states as a result of limitation on length. With a compartment in the rear having 19 sq. ft. of floor space for baggage, mail or express, the seating capacity becomes 24, with 5 supplementary taxi type folding seats in the baggage section.

Rail car capacity is not a matter subject to legislative regulation but is controlled only by restrictions dictated by good engineering and operating practice. Some rail cars have a capacity of as low as 25 to 30 passengers. Others run to an over-all length of 73 ft., which, if devoted entirely to passengers, provides accommodations for as many as 86 passengers, or 57 ft. of length for baggage or the like. Trailer cars are being operated up to about 73 ft. in length, with seats for 90 passengers if there is no baggage space. Two-car rail motor car trains are now being commonly operated, with the space in the train divided between passengers, mail and baggage as the necessities of the particular operation require.

Possibility of Redistributing Traffic

In studying any particular case, the possibility of redistributing traffic between other services available should first be gone into carefully. It is sometimes possible to rearrange traffic, having in mind not only the passenger service but the freight service available, so that trips at first appearing to be beyond the range of rail car or motor coach capacity, become possibilities for such substitution. Newspapers, express and milk are commodities which can sometimes be properly accommodated by other service without inconvenience to the public. These commodities can be much more readily accommodated on a rail car than on a motor coach. Ordinarily, it is difficult to take care of much more than first class mail and some baggage or newspapers on a motor coach.

The Boston & Maine Transportation Company has in service motor coaches with baggage compartments in the rear, which are capable of carrying six medium sized trunks or 30 sacks of mail. As a practical matter, their

capacity has been found to be ample in the services in which they are used. Then, too, it has been found practical in some instances to reroute some of these commodities so that a reasonable service is retained but trips lightened so that they may be converted to rail car or motor coach operation. It has been surprising to find the number of trips, originally out of the motor coach or rail car range of capacity, which, by rerouting or transfer of commodities to other services, can be considered for substitute vehicles.

The final test in studying any case is, of course, the cost of providing the service with steam equipment, rail car or motor coach. Our experience with rail car costs, as they have been obtained from other companies, is that they extend over a wide range which is disconcerting. It is difficult to obtain figures made up in a uniform manner, and the costs vary greatly, depending upon the type of service and especially upon the length of run. Motor coach costs seem to have less variation as between carriers. We now find that the only satisfactory way for us to analyze each problem is to use costs based upon our own experience. On account of their importance and wide variation in different cases, we attempt to estimate the labor expense for the exact runs involved; similarly with respect to interest and depreciation. Fuel and maintenance are figured on a per mile basis, based on experience.

The motor coach has a big advantage over the rail car in wage costs. Motor coaches have a one man crew with daily wages of something like \$5. A rail car has a crew of at least two men whose minimum daily wages amount to \$14.04, and frequently a crew of three men with wages of \$19.70. Furthermore, the restrictions as to hours and mileage of the rail car crews are such as frequently to increase these minimum figures. These differences are very important where the volume of traffic is within the capacity of the motor coach; they are less important where the volume of traffic will fill a rail car unit.

On the Boston & Maine, after passing through a transition period, it has now become very largely a matter of the volume of traffic to be handled, which determines whether a rail car or a motor coach will be used in any case of substitution. The first experience of this road with these units was on a branch line of very light traffic density. A small motor rail car was substituted for steam service and the operating expenses substantially reduced. The mileage, however, was very low, which resulted in the cost still being excessive. This rail car was then replaced with a motor coach and the cost still further reduced.

An interesting development has since taken place. The distance from the town at the end of the branch line to the principal adjacent city, by bus line following the branch line of the railroad on the parallel highway, and by main line railroad, is 13 miles; the main highway distance between the two is only 8 miles. The substitute motor coach still furnishes some service parallel to the branch line, but its principal activity is in carrying passengers over the short route to the neighboring city. This is, of course, an improvement in service to the community.

The Boston & Maine Situation

The Boston & Maine now has 24 rail motor cars in operation. Its transportation company has 72 motor coaches, of which 22 may be said to be operating in substitution for rail service. On the other hand, it should be pointed out that there is some rail car mileage being operated, not in substitution for steam rail service but in addition to the former steam service, in an effort to attract business by increasing the frequency of service.

This type of rail car service is being operated on main lines and experience seems to indicate it is worth while.

In one instance, the service on a branch line has been increased with rail car operation, compared with what it was with steam operation, after some experimenting was done with motor coaches. Steam rail service was curtailed and supplemented by motor coach trips, the total number of trips being increased. Later, when a rail car became available, it was found that it was more efficient to provide all the service by rail car rather than part by steam and part by motor coach.

On another line, 96 miles in length, between Worcester, Mass., and Concord, N. H., all the rail service is now provided by rail car units. The arrangement of trips with a minimum number of units made it impossible to make one main line connection, important for mail and passengers for a part of the line, so a motor coach was put in to cover this deficiency.

In New England, intrastate motor coach operations are very thoroughly regulated. This is as it should be, but in some instances the Boston & Maine has been unable to convince those having the licensing power that they should make substitutions of motor coaches for rail service where the railroad has felt it desirable. This has retarded the use of motor coaches to their full advantage. On the other hand, the substitution of rail cars for steam service lies entirely with the railroad management, and the Boston & Maine today is operating rail cars to substantially the greatest possible extent, having available only one-car and two-car rail units. It is now studying the possibilities with respect to heavier units capable of handling three cars.

I will briefly outline some of the typical rail car and motor coach operations on the Boston & Maine. Rail cars are now being operated at the rate of 970,000 train miles a year. The Worcester-Concord run previously referred to is an example of the most common use of these units. It is an out and out substitution of rail car units for steam trains, made because the volume of traffic was such that it could be handled by the rail car. This operation is a 100 per cent change over, while on the other lines only part of the service has been changed.

On a 21 mile line between Plymouth, N. H., and Lincoln, the two steam trips were changed over to rail car and, because of the less expensive operation, a third trip was added. Main line service between Boston and Lawrence, 26 miles, was increased during the normal hours and two of the trips made by rail car with very short turn around time.

Train service between Boston and Portland was considerably speeded up, in part by eliminating stops for through trains. It was desirable to serve some of these places and feed into and from the express trains at their midway stop. The rail car, on account of its economy of operation, made such a service feasible.

A suburban service is operated between Northampton, Mass., and Springfield, 17 miles. There is a demand for a frequent service but the traffic is not heavy. It could be reasonably taken care of at least in part by motor coaches, but a competitive condition with a trolley company makes it impractical to obtain licenses to operate, so a 73 ft. rail car making five round trips a day is being used.

Motor coaches covering over a million miles a year are being operated by the Boston & Maine Transportation Company. A substantial amount of this is paralleling the railroad in competition with independent motor coaches operating without licenses on interstate routes. People are traveling on them because of the lower rates and the desire to use a motor coach. Highway operation by the railroad makes it possible for it to compete for

these passengers and to meet rate cuts without changing the rate structure of the railroad.

A motor coach is operated 13 miles between Franklin, N. H., and Bristol, in replacement of rail passenger service, except that express is handled in freight service. More frequent service is furnished by motor coach than was furnished by rail, making connections with main line trains. This operation is in sparsely settled territory where the traffic is light and the rail losses substantial. The operation of a rail car would be an extravagance. At Bristol passengers and mail are delivered right in the center of the town instead of at the foot of a long, steep hill, and at Franklin the school children are taken right to the school. Winter conditions are severe and the highway had never been kept open until the transportation company bought a tractor to demonstrate that it could be done. This type of operation to reduce rail operating losses is probably where the motor coach can be of the greatest benefit to the railroad.

Between Northampton and Greenfield, Mass., 19 miles, a motor coach line replaces some steam rail service and some stops on other trains which have been speeded up. An independent trolley line connecting a beach with the railroad at Hampton, N. H., failed on account of lack of business, so the transportation company put in a coach line because of its value to the railroad as a feeder. The coach line just falls short of earning its full cost but it is a worth-while operation as it is an encouragement for people to travel by rail rather than by automobile.

Motor Transport Division, A. R. A., Calls First Meeting

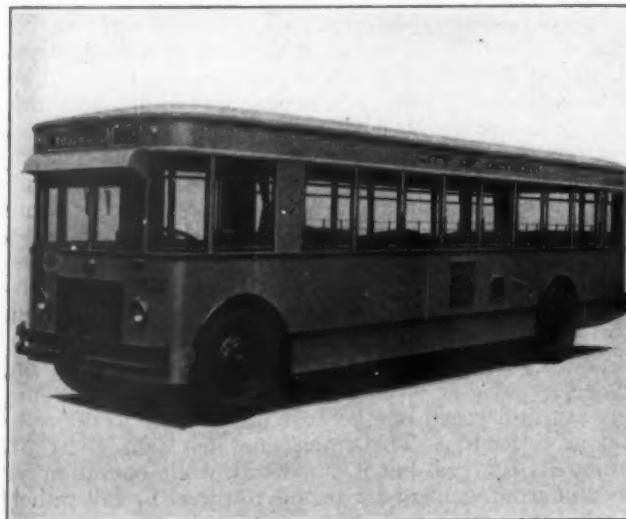
THE first, or organization, meeting of the new Motor Transport Division of the American Railway Association will be held at Chicago, on January 25 and 27, at which time a permanent organization will be effected and the scope of the work of the division will be discussed. The meeting has been called by R. H. Aishton, president of the American Railway Association, who has placed the organization and the preparation of the work of the division in the hands of a temporary general committee, under the chairmanship of A. P. Russell, vice-president of the New York, New Haven & Hartford, consisting of the members of the executive committee of the Railroad Motor Transport Conference, the predecessor organization of the Motor Transport Division. George M. Campbell, of New York, assistant to the secretary of the association, has been appointed secretary of the Motor Transport Division.

The work of the Motor Transport Division will be divided among three sections, to study the application to steam railway service of the motor coach, the motor truck and the rail motor car respectively. The purpose of the organization will be to bring together the railways interested in the development of motor transportation, freight and passenger, in order that they may study the problems arising therefrom, and, through co-operation, devise the most effective means possible for the development of such transportation.

Letters have been sent to the railways asking them each to designate one officer to act as its voting representative. Other officers may be sent to the meetings also. The membership in the division will be confined entirely to representatives of railways or their subsidiaries.

Metropolitan All-Steel 40-Passenger Coach

A new all-steel coach with comfortable accommodations for 40 seated passengers and ample floor area to carry 40 or more standees without crowding has been developed by the American Car & Foundry Motors Company, 30 Church street, New York. The floor plan



The A. C. F. Metropolitan All-Steel Coach Has a Capacity of 40 Seated Passengers and 40 Standees

and external appearance are somewhat akin to that of a modern street car.

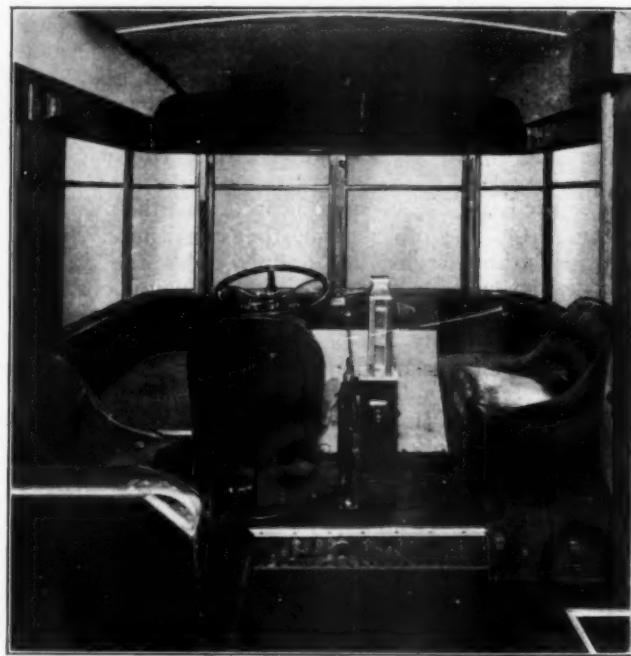
Instead of being a structurally self-sufficient chassis with a superimposed box-like wood body, the coach consists of an all-steel coach body possessing inherent structural strength, to which the axles are attached and in which the power plant, controls and seating is contained. The aim has been to make the chassis frame a beam between the axles, rigid, non-yielding and non-twisting. To do this, channel-shaped, pressed steel rails have been joined by tubular and channel cross members. The A.C.F. all-steel coach follows established railway carbuilding practice in respect to frame construction.

The structural framing dictates a radically different exterior. Instead of placing the engine under a hood ahead of the body and giving over nearly one-third of the overall length to non-productive space, in this de-

sign it is carried midships at the right side. Over the engine, a pair of two-passenger seats, back to back, form a gas-tight housing. In an overall length of 30 ft., no greater than a conventional motor coach, 40 passenger seats are provided and 40 additional standees may be handled without crowding.

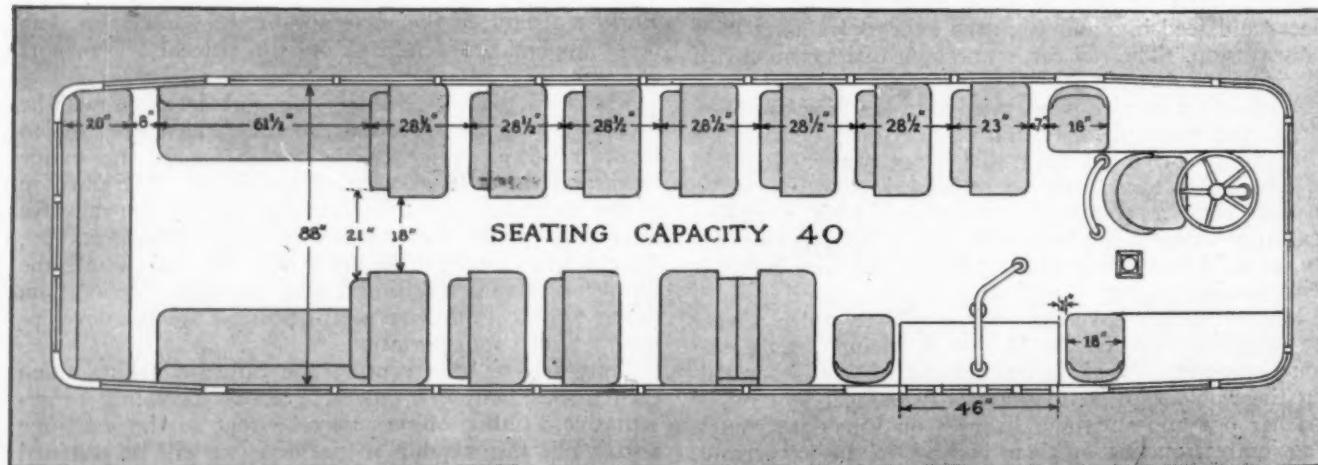
The interior layout has all the requisites for successful mass transportation. Air-operated, double two-leaf doors at the right front facilitate rapid loading and unloading. Incoming passengers move slightly forward to pay their fares. At the front is a large well with 25 sq. ft. of floor space to prevent incoming passengers from blocking the door. At and around the exit door is ample floor space to facilitate the movement of outgoing passengers.

The aisles are wide to provide room for standees with-



Ample Room Is Provided Around the Driver's Seat for Discharging and Receiving Passengers

out blocking the aisle and delaying the coach movement by retarding the exit of other passengers. At the seat backs, the aisle width is 21 in. Over 25 sq. ft. of clear floor space at the rear provides adequate standing room for 15 persons without uncomfortable crowding.



The Seating Arrangement of the A. C. F. Coach Resembles Somewhat That of a Modern Street Car

Good air conditions are assured, for the cubic capacity of the coach is nearly 1,500 cu. ft., or more than 35 cu. ft. per seated passenger. Four large ventilators in the roof and a warm-air heating system which circulates a large quantity of fresh warm air from the radiator, make the coach as comfortable in winter as in summer.

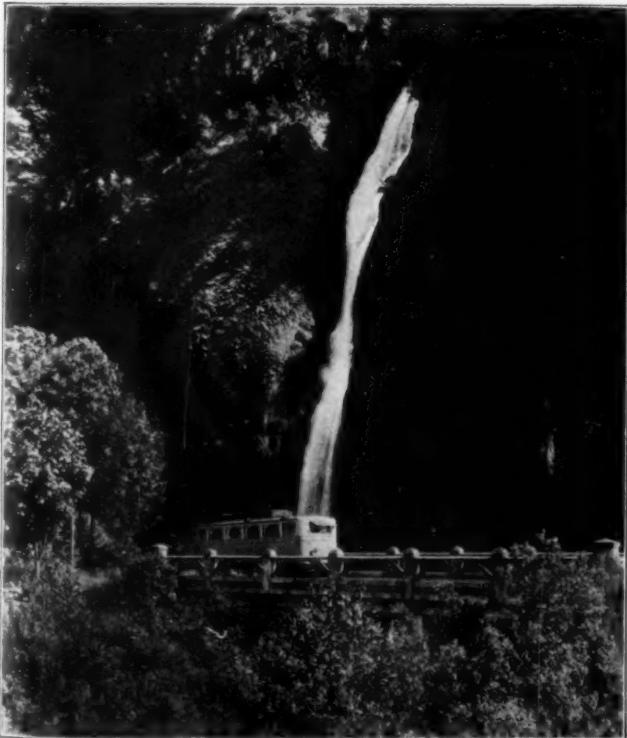
The Brill seats with light weight pedestals and pressed steel frames have deep cushions upholstered with leather. The seats are 35 in. in width to accommodate two passengers comfortably. Ample leg room is provided by the 28½-in. seat spacing longitudinally, in addition to which the seat-backs are recessed.

Ten 21 c.p. lamps, with diffusing lenses, afford illumination without shadows or glare.

The coach is powered by a six-cylinder 4¼-in. by 5½-in. Hall-Scott engine, developing nearly 100 hp. at less than 2,000 r.p.m. The mounting varies slightly because of the novel seat plan of the coach. Mounted midships toward the right side of the coach, the engine rests on 7-in. channels, the ends of which are carried by cross beams. These, in turn, are gusseted to the side sills and pillars. Thus, the engine-bed transmits the weight of the engine and its torque reaction into the framing of the coach body, distributing it so that no concentrated loads occur.

The service brakes, air operated in all four-wheels, are of the metal-to-metal type with cast alloy-steel shoes and hard drums. The rear wheel brakes are 16½ in. by 6 in. and the front wheel 16½ in. by 4 in. The total service brake area is 1,036 sq. in., nearly one square inch for every 20 lb. of normally loaded coach. For parking and storing, a supplementary driveshaft brake of the disk type, 16 in. in diameter, is fitted to the coach.

THE RIO GRANDE MOTOR WAY, INC., one of the motor coach operating subsidiaries of the Denver & Rio Grande Western, has been given permission by the Colorado Public Utilities Commission to discontinue its motor coach service between Alamosa, Colo., and Walsenburg, during the winter months.



A Union Pacific Mack Coach at Horsetail Falls on the Portland-Pendleton Route

Tomorrow's Motor Coach Legislation*

By A. M. Hill

President, Blue and Gray Lines, Charleston, W. Va.

THE benefits of proper interstate regulation are many, embodying primarily protection of the public as to the character of service and the responsibility and reliability of the operator, and the placing of interstate coach operations on the same high plane of public service that has followed sane and wise regulation of lines wholly within a number of our states.

A committee of coach operators has been working for more than two years upon a bill to present to Congress, and upon the formation of the motor bus division of the American Automobile Association, this committee's work was taken over by that organization. The committee has worked in closest co-operation with the National Association of Railroad and Utilities Commissioners, and in addition it has had numerous conferences with railroad and electric railway representatives.

A bill was introduced in the Senate by the utilities commissioners in the early part of 1926, known as "Senate Bill No. 1734," which embodied the regulation of interstate truck lines as well as passenger carriers. Due to the great opposition on the part of practically all interests making use of trucks, it was impossible for this bill to pass. A revised bill known as the "Dennison Bill" was introduced in the last short session of Congress, which had for its purpose the regulation of passenger carriers only. This bill was based upon the fundamental principle that motor coach operation is essentially local in character, making use of highways provided by the various states, and that its regulation should be administered by the various state commissions. All operators who expressed an opinion, as well as all state commissioners, were unanimous upon this point. A provision was made whereby, in the case of disagreement between state commissions or upon certain other conditions, an appeal might be taken to the Interstate Commerce Commission.

The legislative committee of the motor coach division of the American Automobile Association will meet in Washington in November, at which time a final bill will be prepared for presentation at the next session of Congress. This committee will, at that time, consider the various communications, briefs, etc., which may be presented to it by those interested in the development of the industry, and it is hoped that the next bill which will be introduced, and which will have an excellent chance of passage within the next six months, will be constructive in character and serve as a great boon to the development of motor coach operation over the country.

Important Court Decisions

The problem of interstate regulation, however, is not the only important problem which confronts the industry today. There is a distinct effort being made upon the part of antagonists to motor coach development to obtain court interpretations of existing laws which will practically prohibit coach operation by other than the owners of the older means of transportation. A very striking decision was that of the Egyptian Transportation Company case in Illinois, and more recent and even more far reaching in its effect, the recent decision of the Supreme Court of West Virginia in the cases of the Baltimore & Ohio and the Monongahela West Penn

*From a paper read at the meeting of the Society of Automotive Engineers in Chicago on October 27.

Public Service Company and others versus the state road commission of West Virginia, Reynolds Taxi Company and Bartlett Brothers Bus Company.

In these cases the courts have handed down decisions to the effect that where routes parallel or compete with existing rail lines, the rail line has first right to the motor coach certificate. In West Virginia this decision has met with instant public disapproval on account of the fact that inherent rights to the state highways are thus given to rail lines which have had no part and paid no money in the building and maintaining of these highways. The highways of West Virginia have not been built by direct taxation, but through the use of funds obtained by bond issue, plus the license and gasoline taxes from motor vehicles, the interest and sinking fund upon the road bond issue being cared for from the same source.

In Illinois a very interesting case is developing which, if it should result in a decision against the steam railway lines, would be far reaching in its effect. The contention is made in this case, that under present laws and railroad charters, a railroad cannot own a competitive motor coach line, either directly or through a subsidiary. If some check as this does not come, it is very apparent that there is going to be a general attempt to obtain restrictive and repressive legislation against the motor coach carrier, either by court interpretations of present laws or the passage of laws aimed to accomplish the same result. It is equally apparent that this is a two-edged sword and that the motor coach operators of the country, in their efforts to preserve their economic life and as a means of combating their antagonists, will succeed in arousing considerable public sentiment against the railroad companies. It must not be forgotten that the motor coach operators of the country are in extremely close contact with the public and that they represent invested capital.

New Device Uses Engine Power to Reduce Steering Effort

A POWER steering device has been developed by the Bethlehem Steel Company, Bethlehem, Pa., primarily for the control of heavy duty machinery, and has been reduced to proportions suitable for automobiles through cooperation between Bethlehem

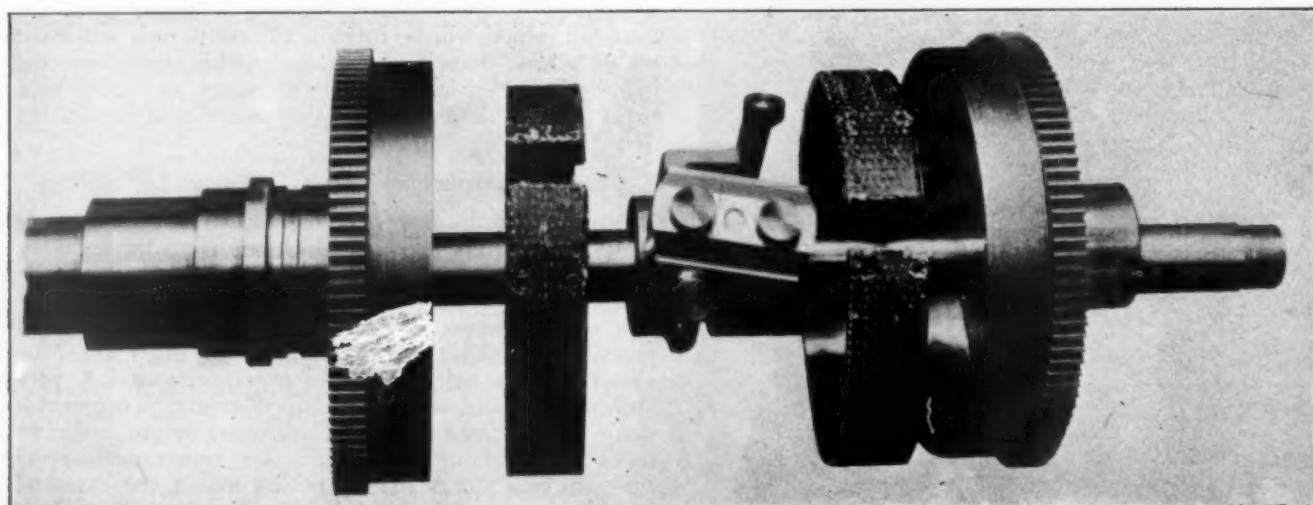
and Stutz engineers. It has been demonstrated recently on a Stutz sedan. The mechanism is known as a torque amplifier, a device for stepping up torque to any desired extent.

The device comprises two small drums with gear teeth on the outer circumference, which are positively driven in opposite directions at a slow speed by means of a universal-jointed shaft from the engine. Inside of each drum there is a friction-lined expanding clutch band. One end of the band is anchored to an arm extending radially from the shaft carrying the steering worm, while the other is adapted to be moved away from the former, and the clutch band thereby expanded and brought into driving contact with the drum, by a radial arm extending from the shaft carrying the steering wheel.

The two clutches are so arranged that one will be engaged by right hand and the other by left hand rotation of the steering wheel. The motion is transmitted to the worm shaft by the radial arm carrying the clutch band. A small pivoted member serves as an automatic adjustment, compensating the wear, etc., so that the friction bands are always at the proper tension, and no backlash can develop.

In external appearance the device is a small cylindrical casing on the steering column beneath the floor boards and immediately above the steering gear proper. From the driver's point of view the operation is in no way different from that of the ordinary car except for the extreme ease of steering. The "amplification" selected is 10 to 1, which means that with the same steering ratio as ordinarily employed the car steers with one-tenth of the usual manual effort. In parking, turning around in narrow streets, and for other maneuvering where many cuts are required with the car stationary or nearly so, the whole operation can be carried out easily with one hand and without any of the usual strenuous exertion, a point best appreciated perhaps by the woman driver. A further effect is that on rough roads the mere weight of the hand will keep the steering wheel perfectly steady. Another and unexpected result is that at high speeds the steering wheel is unusually stable and conveys a sense of complete security.

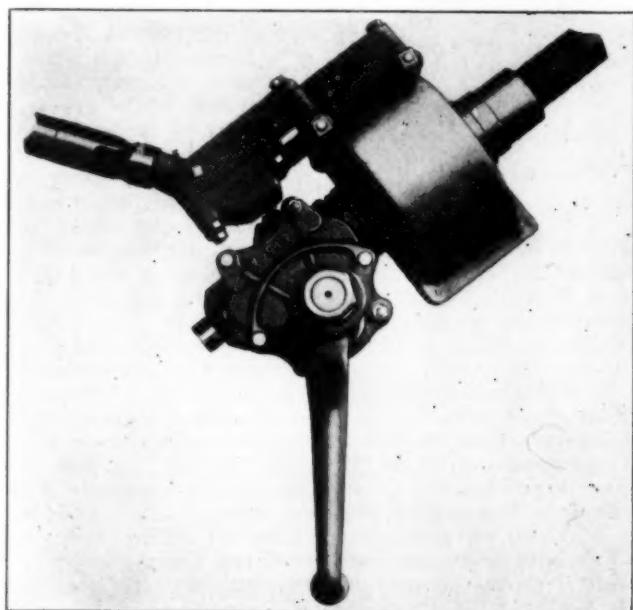
In the present installation the steering ratio, ordinarily 16 to 1, has been reduced to 6.7 to 1, in order to exhibit the characteristic of the device as completely as possible. While this low ratio has the desirable



Automobile Amplifier with Housing Removed, Showing Friction Bands, Control Arms and Lashlock for Eliminating Backlash

features that only a fraction of a turn is necessary to negotiate a sharp corner, eliminating the usual winding and unwinding process, it is nevertheless the general opinion that for the most convenient operation a ratio somewhere between 6.7 to 1 and the old 16 to 1 ratio should be chosen, more especially as the balloon tire has so thoroughly educated the present-day driver in turning the steering wheel through large angles. This point requires experimental investigation. It must be remembered that with the ordinary steering arrangement, ease of steering in any given design is proportional to the angle necessary at the steering wheel for a given result on the front wheels, so that the experience hitherto gained along this line is not a good basis for considering "amplified" steering where no such proportionality exists, and any steering ratio and any desired steering effort can be selected wholly on the basis of what best suits the driver.

Connection to the engine can be effected in various ways, preferably by connection to one of the external appliances already geared to the engine. The horse power required is negligible except in the case of turning when the car is at rest, but even here the maximum



A Torque Amplifier on the Steering Column of an Automobile—Engine Connection Shown at Upper Left

required is only a fraction of a horse power. If the engine should die the driver would still have unhindered control of his steering, although he no longer receives assistance from the engine. The amplifier, however, will continue to prevent road shocks from coming back to the steering wheel.

Application on Heavy Truck

In addition to this installation on the Stutz, a torque amplifier has been applied to a heavy truck, and the remarkable phenomenon is presented of a vehicle having a load of more than 6,000 lb. on the front wheels being handled as easily and surely as a light passenger car.

Torque amplifiers have been designed for various purposes. One, working on the same principle as the steering control, is now under test for the rapid and precise pointing of anti-aircraft guns. The device is the invention of Henry W. Nieman, a Bethlehem steel engineer.

Motor Transport News

THE NORTHLAND TRANSPORTATION COMPANY, the subsidiary of the Great Northern, has purchased 50 new motor coaches during the past year, at a cost of over \$500,000.

A 16-PASSENGER MOTOR COACH of the Western Slope Motor Way, Inc., subsidiary of the Denver & Rio Grande Western, was completely destroyed by fire near Alamosa, Colo., on December 2.

AN ORDER requiring all motor coaches operating exclusively between fixed termini in the state of Oregon to pick up passengers at any points along their routes when seats are available, has been issued by the Public Service Commission of the state.

THE EDUCATIONAL and employee relations work carried on by the Southern Pacific has been extended to include the employees of the motor coach operating subsidiary of the railway, the Southern Pacific Motor Transport Company. Employees of the motor transport company in the vicinity of Portland, Ore., are assembled at convenient junction points twice a year for general discussion of the service provided by the company.

THE WABASH, which has been operating tractor and trailer service between several of its freight stations in Chicago for approximately one year, has recently added one tractor and four semi-trailers to the fleet of equipment used in this service. The Arthur Dixon Transfer Company owns and operates the equipment for the Wabash. Three tractors and 11 semi-trailers are now being used.

West Virginia Operators Get Stay Until December 30

The Supreme Court of Appeals of West Virginia has granted to the independent motor coach operators concerned in its decision granting prior highway rights to the Baltimore & Ohio and an electric railway (see *Motor Transport Section*, October 22, page 801) a stay until December 30, the purpose being to permit the taking of an appeal to the United States Supreme Court.

Highway Transport in Oregon

Class A motor carriers of freight in the state of Oregon, including those whose gross annual income exceeds \$10,000, reported operating revenues of \$2,841,562.36, during the 10 months from January 1 to November 1 of this year. Their operating expenses during the same period were \$2,647,682.89, making the net operating income \$193,879.47. The operating revenues of the motor coach operators were \$3,165,672.23, and their operating expenses, \$3,054,207.39, leaving a net operating income of \$111,464.84. There are now 1,131 motor coach and motor truck common carriers operating on the Oregon highways and they cover approximately 1,862 miles of routes. According to the Public Service Commission, they paid fees of \$134,137.07, during the first 10 months of this year.

New York Trucking Investigation Amplified

The Interstate Commerce Commission has supplemented its order instituting an investigation of the handling of freight at and to and from constructive and off-track stations on Manhattan Island, New York City, by means of trucks, drays, etc., to include investigation into the circumstances and conditions surrounding all services performed by privately owned street or highway vehicles for and on behalf of carriers serving or holding themselves out to serve Manhattan Island. The inquiry will cover the handling of freight and all practices and arrangements, contractual or otherwise in respect thereto, whether such service is performed at, between or to or from constructive and off-track stations, or at, between, from or to on-line stations and all lighterage points within the lighterage limits of New York harbor.

Hearing on Alton Application for St. Louis-Kansas City Coach Route Certificate

The Missouri Public Service Commission held a hearing at Jefferson City, Mo., on December 5, on the application of the Chicago & Alton for permission to operate a motor coach line between St. Louis, Mo., and Kansas City, a distance of approximately 275 miles. The Alton Transportation Company, subsidiary of the railway, proposes to operate over this route three round-trip schedules daily, two round trips being made in the daytime and one round trip at night.

The Alton was represented at the hearing by G. J. Charlton, passenger traffic manager, and X. H. Cornell, vice-president and general manager of the Alton Transportation Company. Its application was supported by representatives of various organizations from the cities and towns which would be served by the proposed coach line.

Opposing the application were representatives of the two independent motor coach lines already in operation over the cross-state highway No. 40, which the Alton proposes to use. The application of the Alton was also opposed by the Wabash.

Uniform Motor Coach Specifications Code to Be Completed Soon

The National Automobile Chamber of Commerce and Society of Automotive Engineers committee, which has been working on the task of developing a uniform motor coach specifications code, has nearly finished the preparation of its report, which will be submitted to many organizations for endorsement before it is ultimately given to the state authorities for their consideration and possible adoption. The completed report will be made public within the next few weeks.

Those sponsoring the proposed code believe that its acceptance will result in two things: An end to conflicting state laws covering the construction and operation of motor coaches, and a greater advantage to coach operators and the public.

Pennsylvania Commission Adopts Uniform Account Classifications

The Public Service Commission of Pennsylvania on November 21 adopted uniform classifications of accounts for motor vehicle common carriers of passengers and ordered their use by such carriers in the state of Pennsylvania, beginning on January 1, 1928. Separate classifications have been prepared for carriers in Classes A, B and C. Class A includes all motor vehicle common carriers having average total annual operating revenues exceeding \$250,000. Class B carriers are those having operating revenues exceeding \$50,000 but not exceeding \$250,000 annually, and Class C carriers are those with operating revenues exceeding \$10,000 but not exceeding \$50,000.

The commission defines common carriers of passengers by motor vehicles as individuals, partnerships, associations and corporations (both private and municipal), which carry passengers for hire in taxicabs and motor buses on call and demand, over fixed routes, in sightseeing service, and in "local group or party" service. Appropriate accounts have been provided in the classifications for recording the freight and express operations of those carriers which handle both passengers and freight or express.

Motor Coach Operators to Recommend Federal Regulation

The regulation of motor coaches engaged in interstate commerce, with the primary authority vested in the state commissions but with the right of appeal to the Interstate Commerce Commission, is soon to be recommended to Congress by 2,100 affiliated coach operators, according to a statement issued by the bus division of the American Automobile Association. Senator Watson, chairman of the Senate committee on interstate commerce, and Representative Denison, member of the House committee on interstate and foreign commerce, are sponsoring the bills. The bills to be introduced are similar to those presented on behalf of the motor coach operators at the last session of Congress.

"The motor coach industry of the United States," says a statement of the bus division, "representing an investment in rolling stock of over \$400,000,000, has grown to the stage where

some regulation of those engaged in interstate commerce is essential. Co-ordinated control by the state utility commissions, in the issuing of certificates of public convenience and necessity, with the right of appeal to the Interstate Commerce Commission, seems to be the logical step at the present time. More than 53 per cent, or over 42,000, of the total of 80,000 motor coaches in operation are now engaged as common carriers, and the number is steadily increasing."

Motor Transport Officers

John J. Mantell, who recently resigned as vice-president of the Erie at New York, has been elected president of the American Freight Service, Inc., with headquarters at 17

Battery place, New York. Offices will also be maintained at Boston. Associated with Mr. Mantell in this enterprise are George F. Naphen and M. M. Cunniff, who recently completed the reorganization of the association, of which Naphen & Co., 14 Wall street, New York, are fiscal agents. The American Freight Service, Inc., is a concern the purpose of which is to receive, forward and deliver freight in containers. It will also have a supply of freight containers for lease to



J. J. Mantell

carriers or others. Mr. Mantell was born on June 24, 1884, at Elmira, N. Y. He attended Elmira Academy and began service as a clerk and stenographer in the office of the superintendent of the Erie in that city in 1899. Subsequently he was transferred to Croxton yard (Jersey City, N. J.) as a yard Clerk. Advancing through various positions he was in 1908 appointed general yardmaster. From 1909 until 1915 he served consecutively as trainmaster of the Delaware and Jefferson divisions, terminal trainmaster at Jersey City and superintendent of the Wyoming division. In 1915 he became superintendent of the Jersey City terminals and remained in that position for two years at which time he was advanced to general superintendent, Lines East, of the Erie, with headquarters at New York. During the period of federal control he was terminal manager of the Port of New York for the United States Railroad Administration. At the end of federal control he became manager of the eastern region of the Erie and in 1922 was elected vice-president. It was under Mr. Mantell's direction that motor truck service in lieu of car floating for freight handling was begun by the Erie.

Among the Manufacturers

The White Company, Cleveland, Ohio, is opening new branch sales and service buildings at Providence, R. I., Hartford, Conn., and Toronto, Ont., during the months of December and January.

George W. Smith, Jr., technical assistant to the vice-president and general manager of the White Motor Company, Cleveland, Ohio, has been promoted to works manager, succeeding R. M. Hidey, who has resigned.

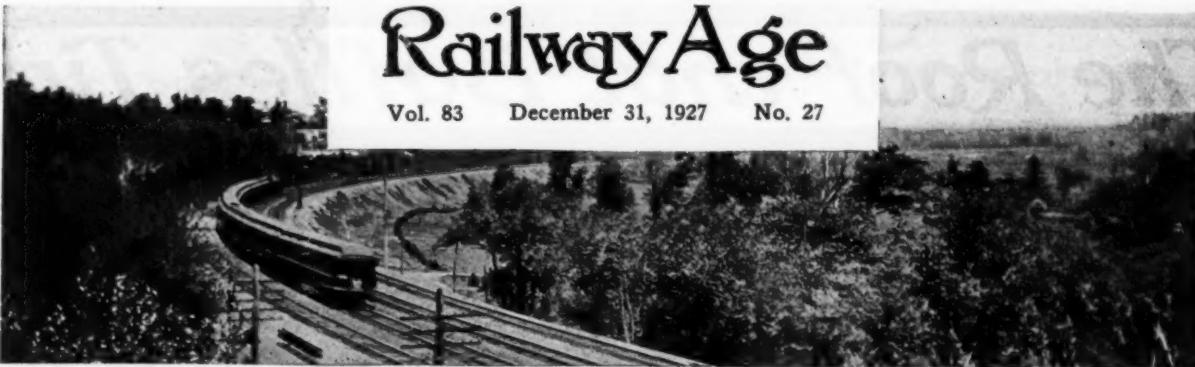
C. W. Poyer has been appointed transportation engineer of the Selden Truck Corporation, Rochester, N. Y., in charge of the activities of the new special equipment department. This department will compile data and information regarding motor transportation and the special requirements necessary to meet hauling conditions of unusual kinds.

Obituary

M. O'Neil, chairman of the board of directors of the General Tire & Rubber Co., Akron, Ohio, died in that city on December 16.

Railway Age

Vol. 83 December 31, 1927 No. 27



On the B. & A. near Weston, Mass.

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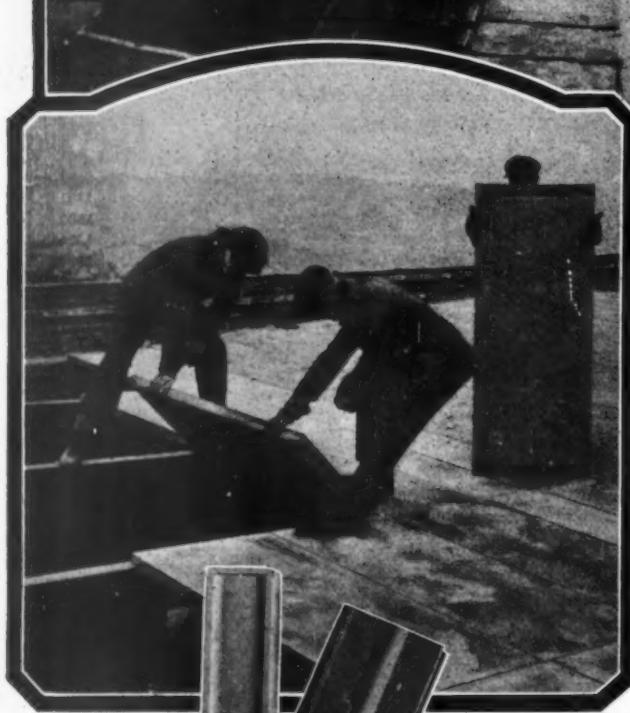
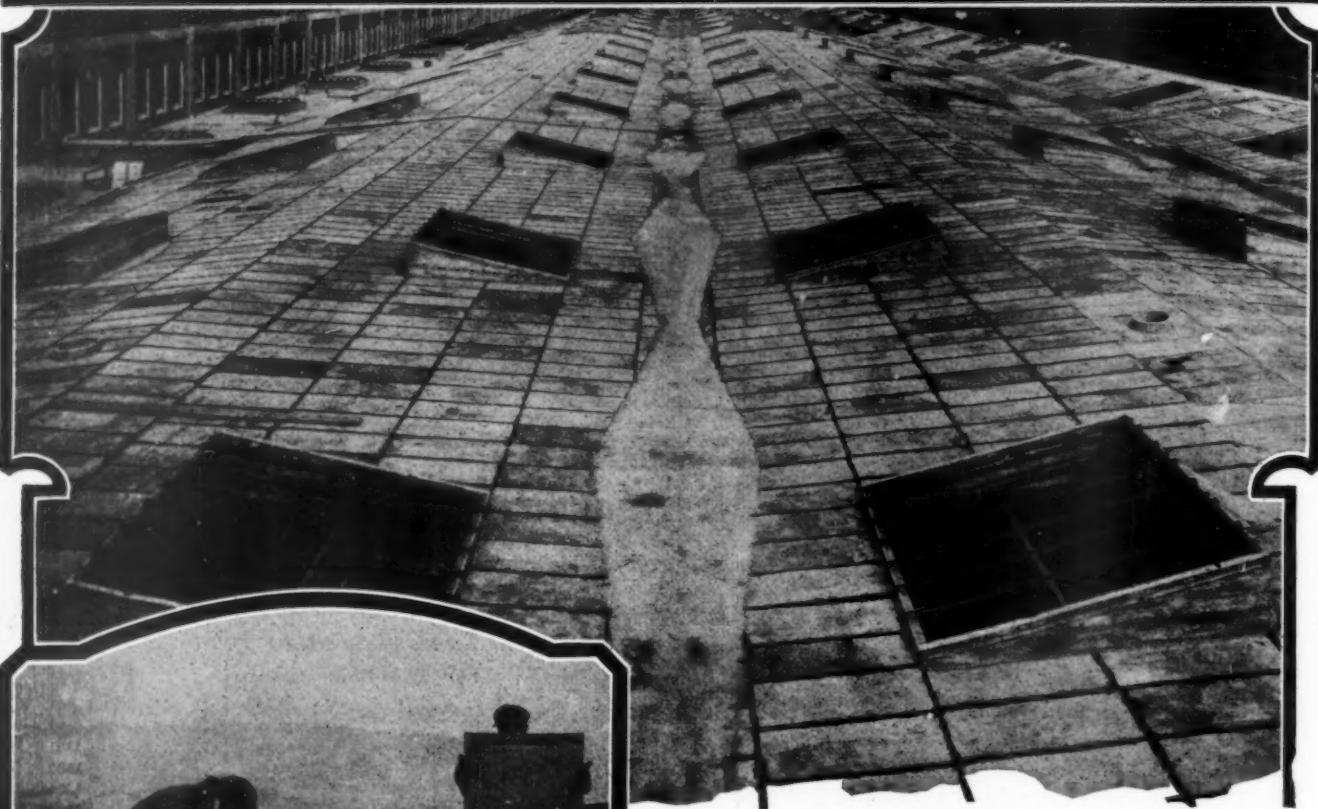
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Railway Age

Vol. 83, No. 27

December 31, 1927

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Equipment Buying Revives

THE members of the *Railway Age* editorial staff who are compiling the totals of the car and locomotive orders during 1927 for the Annual Statistical Number which is to be published next week, have been confronted at almost the last moment before their articles go to press with the pleasant necessity of revising them to give a somewhat more optimistic outlook. This is because the last two weeks of the year prove to be two of the best weeks of 1927. Following upon a period extending over five months in which freight cars ordered totaled only about 3,000, there were reported in the Equipment and Supplies column of last week's *Railway Age* 7,000 cars and one order reported in the present issue is for 4,500 cars. With the placing of these orders the 1927 total of freight cars ordered passes that of 1926. These orders also make December the best month either of 1927 or of 1926, with the exception only of January, 1927. Locomotive buying has also shown signs of life after several inactive months. Practical evidence of this much-to-be-wished-for circumstance has been the placing of 68 locomotives by the Southern Railway, in addition to which the Mobile & Ohio has placed 13. The Boston & Maine, which has been reported as considering the purchase of new power for several months, has finally acted and placed an order for 20 heavy freight locomotives. These orders, while they serve to make December the best month of 1927, with the single exception of May, do not succeed in bringing the 1927 total above that of 1926. The close of the year finds the equipment builders in a much more optimistic frame of mind than has been justified at any earlier part of the year.

Continuous Service for Yard Locomotives

AT a conservative estimate, $1\frac{1}{2}$ tons of coal are wasted in knocking a fire and rebuilding it, or some 15 per cent of the amount of coal used by a yard engine daily. The Rock Island has eliminated much of this waste by keeping its yard locomotives in continuous service, as described elsewhere in this issue. In triple-crewing yard power, the Rock Island and other railways using this practice have not been prompted entirely by the fuel saving, nor yet by the increase in utilization of locomotives, for there are many other factors entering into the question. For example, the enginehouse expense is less, not only for the yard locomotives, but for all locomotives using the terminal. The enginehouse is less crowded and the necessary work may be done more expeditiously. The cost of maintenance of the yard locomotives is also reduced, particularly the time of boiler maintenance. This is because boilers are less likely to require repairs when they are kept at an even heat most of the time than when they are being heated and permitted to cool

several times daily. It may be interesting to note here that one switch engine at the Armourdale yard of the Rock Island made 4,400 miles in one month out of the possible 4,464 miles, based on the Interstate Commerce Commission's allotment of six miles an hour to this class of power. It is clearly demonstrated that the double and triple crewing of switching locomotives, so as to keep them in continuous service, has passed the experimental stage. On the Rock Island, in fact, this procedure has become the standard practice, and although it has been only a short period since its inauguration, the operating statistics are already reflecting its beneficial results. The subject is well worthy of serious consideration. Conditions on the Rock Island are not particularly favorable for such performances; they are similar to yard conditions existing on nearly every railway. There is no apparent reason why the method cannot be used on other railways, where it would seem that similar gratifying results would ensue.

The Surest Relief for Highway Congestion

FEW passenger traffic officers believe that short haul coach passengers, who have abandoned the railways for the highways in such large numbers, will ever in similar numbers return to the rails. And probably in most parts of the country this opinion is justified. However, there are some situations where, present tendencies continuing, there is a possibility that once more the railroads will be called upon to handle a growing volume of this traffic. We refer to the more congested sections of the country where highway traffic conditions, in spite of continued roadway construction, grow worse month by month. Such sections are for the most part located where railroads now provide suburban service and experience has been that while the low-rate commuters stick to the trains, the full-fare passengers have shown a tendency to use their own cars or ride in highway motor coaches. The competition offered by private automobiles and motor coaches for full-rate passengers in suburban territory does not seem to be based entirely upon lower price, but on service as well, since most of the full-rate passengers travel at non-rush hours when trains are relatively few and are for the most part locals. If railroads could find means to provide a service comparable in convenience to that now provided on the highways and make certain concessions in the way of round-trip reduced fares for shoppers and theater-goers, perhaps, as highway congestion continues to increase, the tide of traffic might again turn railward. This, at least, is the view of one railroad officer who has carefully studied the situation in a territory such as that here described. It will be interesting to see the actual developments in this direction in the next year or two in our most highly congested sections, since what happens in them now may take place in slightly less dense centers

five or ten years hence. A suburban train can carry 700 passengers in comfort and thereby keep 23 highway motor coaches or 175 private automobiles from adding to street congestion in crowded districts.

First Aid Instruction of Electrical Employees Is Vital

THE rapidly increasing use of electricity on the railroads makes advisable a fuller appreciation of the hazards of electrical work, particularly upon high-tension transmission and distribution lines for electric traction, train control, automatic block signaling and other railway facilities. This is not because the railroads have failed to do anything that they should have done to safeguard their electrical workers, as this is not the case, but rather to point out the ever-increasing need of vigilance in all classes of railway electrical work. To this end employees should receive instruction in the safe way to work upon any high-voltage line, with due emphasis on the vital importance of observing every possible precaution. Next to prevention in order of importance is knowing what to do in case of electrical accidents, particularly how to apply the method of artificial respiration to a victim of electrical shock.

Knowing what to do immediately to resuscitate a man suffering from an electrical shock is absolutely essential if he is to be afforded a reasonable chance to regain consciousness. The victim cannot be left alone until medical assistance is obtained because the time is too precious. Every minute counts. Those with experience in such emergencies know the value of artificial resuscitation, pending the arrival of medical assistance. Hence railway electricians, signalmen, linemen, and others exposed to high-voltage lines should be schooled in such matters and be capable of working upon any one who may need such aid. This knowledge and training are all the more important when it is recalled that instances have occurred where men have been killed on comparatively low-voltage circuits.

A signalman was killed recently by a 220-volt power line where it appears that if proper first aid attention had been administered he would have been saved. In this case, the man was rushed to a hospital but it was not until a half hour had elapsed that resuscitation was attempted and then it was too late. While a weak heart may have brought instant death, the evidence indicates that the victim was not given a fighting chance to recover.

What can the railroads do to prevent such an occurrence? This is possibly best answered by noting what a few roads have already done to train their employees in electrical first aid. The Pennsylvania, the Norfolk & Western, the Chicago, Milwaukee & St. Paul, the Atchison, Topeka & Santa Fe, the Illinois Central and recently the Chicago, Burlington & Quincy have issued booklets or placards containing rules and instructions for the safe handling of electrical work and showing how to resuscitate the victim of an electrical accident. The purpose of these printed instructions and the first aid training is to have some one available, preferably a supervisory officer, who is thoroughly familiar with the procedure and who can assume charge and direct operations when an accident occurs. This training aims to instruct the employee how to remove the victim from contact with a live wire, how to apply resuscitation in the approved manner, and how to care for the victim when natural respiration has been restored.

In the safety booklets referred to, the procedure illustrated is substantially similar to that recommended by the National Electric Light Association. This organization has done a great deal in its field in safety first work of this nature. Many large utility companies make such training mandatory with all of their workers who are exposed to electrical hazards; first aid teams have been organized to compete with similar groups in other companies and to assist in an educational way within their own utility organizations, etc. Naturally their interest should be greater, in point of numbers at least, but it is worth the effort to have all railway employees who may be subjected to similar electrical hazards, equally prepared for emergency action.

The Motor Truck in Railroad Construction

WHILE the introduction of the crawler tread, the swinging body and the internal combustion engine in power shovels has resulted in greater flexibility and increased economy in grading operations, these developments bid fair to be overshadowed by the advent of the motor truck in railroad construction. The rapidity with which this development is taking place is indicated by the fact that extensive use of motor trucks was observed on five out of seven large railroad construction projects visited by a member of the *Railway Age* staff in the past two months.

It is not to be inferred from this that the power truck will eventually supplant train haul in railroad building, particularly in situations where large standard-gage dump cars are now found to be advantageous, but it is clear from observation of their performance that motor trucks possess certain advantages that point to a marked increase in their use. Foremost among these is that their employment eliminates the cost of constructing, shifting and maintaining construction tracks. For example, in the construction of yards where an area of considerable width must be filled to a moderate depth, the use of trucks has not only done away with the extensive shifting and relaying of tracks, but has also greatly reduced the spreader operations. On the other hand, on line construction in country involving short but relatively steep cuts and high fills, motor trucks have demonstrated their ability to travel over roads involving heavier grades and sharper curvature than are practicable for the tracks of dump car trains.

Another point in favor of the truck lies in the fact it can be turned and backed up to the head of the bank for rear-end dumping, thereby making it possible to avoid the construction of a filling trestle. The thorough practicability of this plan of operation is demonstrated by the fact that on a single Western project, more than 60 miles of heavy construction was handled during the past year without building a construction trestle of any kind.

However, it goes without saying that employment of motor trucks has not been without its difficulties. This development is still clearly in the experimental stage and mistakes are being made. Contractors have not yet learned all that must be known concerning the types of trucks most suitable for work of various kinds. Heavy, large capacity trucks have been employed in cases where lighter vehicles would have been more economical. High expense for maintenance of equipment has in some cases offset in large measure the saving realized by the elimination of construction tracks. However, the use of the

motor truck has already gone far enough to show that it has a definite place in this field and is awaiting only an accumulation of experience to place it on a thoroughly sound basis in the building of railroad roadbeds.

American Industry as Viewed by Australians

AMONG the numerous delegations that have come within recent years from other countries to the United States to investigate the reasons for the unusual prosperity, the high wages and the high standards of living prevailing in this country, was the "Industrial Delegation" appointed by the government of the Commonwealth of Australia, which visited America this year. This delegation included four employers' representatives, four employees' representatives, two women observers and a government representative and secretary. Australia, like the United States, is a new country. Labor unionism has been much more influential there than here in industrial affairs, and has often been dominant in government. Labor disputes have been subject to settlement by government arbitration courts. The observations of this delegation in its reports, which only recently have been published, are, therefore, especially interesting.

The delegation found that in the United States "the whole country seems to work intensely, and 'efficiency' is the watchword of government, employer, management and employee, whether unionist or non-unionist." It refers to the large investment of capital per worker, and says that "any bona fide undertaking can get money in the United States of America, either to start or to extend, and it seems as if there is always being offered on the market some issue of capital." "The development of power has provided every worker in America with over four horsepower." "The net result is that the production value per wage earner per month based on 100 as representing 1914 is that 133 represents 1923; 140 represents 1925; always keeping the dollar right through at its 1914 value, and the earnings of workers are as high as in 1920."

The delegation remarks that "the scrapping of existing plant to be replaced by later discoveries is very common, but the fact is always brought out that it must be demonstrated that capital cost involved in installing the new plant must be saved by such plant within a certain time; some said two or three years, others said four or five years." "The workers in the United States in the large factories and mass production plants have become used to machinery doing their work, and as little as possible is left to hand labor. The practice of keeping men engaged on obsolete methods when machinery could be more efficiently employed to do work faster and cheaper, and oftentimes better, has passed."

The delegation refers in favorable terms to our railway service. "The whole country," it says, "is served by approximately 250,000 miles of standard gage railways owned by various companies in competition one with the other, as many as seven and eight companies coming into one city. It is very seldom that an alternative route cannot be obtained for any passage or freight. The railways are thus obliged to give the best service and facilities that can be afforded. * * * The service is so good that merchants and manufacturers do not need to carry heavy stocks of raw material, being able to depend on prompt and continuous delivery and on a supply of (motor) trucks for their own despatches." It did not say so, but the delegation must have observed a very strong contrast between railway transportation

conditions in the United States and Australia, the railways in the latter being all owned by the government and having several different gages—circumstances which prevent both such competition and co-operation between the different systems as prevail in the United States.

It reported an increasing amount of co-operation between employer and employee in the United States in the railroad as well as the manufacturing industry. "The old system of the one pulling one way and the other pulling in the opposite direction is apparently disappearing," it said. "The splendid layout of the different plants, the orderliness and cleanliness of the workshops, and the methodical manner in the activities of the employee are the result of co-operation of both. The employer takes an interest in the workman and the workman reciprocates."

The following conclusions were stated by one of the employers' representatives: "From my observations in America it seems to me that the Australian government should confine its activities in industry more to assistance in research and the opening up of markets. The American slogan 'More business in government and less government in business' could well be adopted with advantage by Australia. After reviewing all aspects, unionism in Australia must realize that workmen cannot expect higher wages and shorter hours unless production is maintained, if not increased, so that industry can be carried on profitably. This is acknowledged in America. Methods of production are changing from year to year and it is essential that both employers and employees, through their unions, should adapt themselves to the changes."

The above is a very summary review of a long and interesting document. It shows that intelligent foreign observers who come here with an open mind to ascertain the facts and draw the conclusions that the facts logically warrant reach the same conclusions as unprejudiced American students of economics regarding the reasons for the large average incomes of the various classes of persons in this country, and the standards of living which they make possible. A high average wage per worker is impossible without a high average production per worker. The primary requisite to high average production is a large investment of capital that will create a transportation and industrial plant with a high average capacity per worker. There must be able management in order to develop the plant along the right lines and efficiently organize the entire personnel. Finally, there must be intelligent and cordial co-operation between employers and employees, for without such co-operation the natural results of the investment of capital and the efforts of management will not be obtained.

Some of the delegations from other countries returned to their homes and reported that the unusual prosperity of the United States was due to the payment of high wages. The Australian delegation did not so report because its members evidently saw that this was to reverse cause and effect. The prevailing high wages in this country are due to prosperity and this, in turn, to high average production per capita. It is a good omen for the future of the United States that, as the Australian delegation observed, this fact is constantly becoming more generally recognized in this country by labor leaders and employees, as well as by employers.

An Adelaide (Australia) newspaper commented as follows upon the report of the Australian delegation: "It is made abundantly clear that the distinction between American and Australian industry mainly consists in the fact that America knows next to nothing of the political trade unionism that has so long dominated industrial affairs in this country. The American unions

are deliberately non-political and largely non-militant, and are ever more concerned to co-operate with the employer than to harass and combat him in pursuance of 'the class struggle'. * * * The peace and much of the prosperity of American industry are attributable to the excellent relations existing between employer and employee."

There have been times when labor unions in the United States have sought to attain economic ends by political means. It has been only a few years since railway labor leaders were advocating the Plumb Plan of government ownership of railways. It has been only three years since they took the lead in nominating Senator La Follette for president. It is undoubtedly true, however, that there has been and is less politics in the labor movement in the United States than in any other important industrial country, and that one of the principal reasons for the favorable conditions existing here is the widespread recognition by working men of the fact that they have much more to gain by the use of economic methods, including co-operation with employers, than by political methods.

Is Henry Ford's Experience Important to the Railroads?

JUST now, largely because of Henry Ford's beautification of the humble flivver, commentators throughout the land have had occasion to draw attention to the apparent public demand for "art" in objects of daily use. The well-chosen label "art in industry" has been attached to the efforts of business to meet this real or apparent public demand. There can be no question of the popularity of this subject as a topic for discussion in the papers. Has it, however, any deep-seated existence in the minds of the public, or is it mostly talk? If the reality of the sentiment can be established what, if any, is its importance to the railroads?

In the first place it should be recognized that art, in its true and dignified sense, has never been as complete a stranger on the railroads as it has been in some other industries. Architecture, for instance, was a well established art long prior to the day of modern industry and the railroads have always offered a field for architects of taste and originality—as the prominence of railroad stations among the really beautiful buildings of the country amply proves. In the past few years the railroads have been calling to a greater degree upon experts in interior decoration to aid them in making their passenger trains more attractive. Some progress has been made in making locomotives more decorative. Here, however, enters a matter of taste. Some would beautify the locomotive by hiding its essential parts, whereas others—and real artists among them—believe that no true beauty can be gained through disguise. That savors too much of veneering, of which no true craftsman approves.

Does "art in industry" pay? It cannot be denied that attractive packages make the goods they contain easier of disposal and that the sale of automobiles which the manufacturer once said could be "any color as long as they are black" declined until it no longer paid to build them. Railroads are complex—they not only have vehicles, but they also have buildings, bridges, interiors and a multitude of objects into which questions of design may enter. To make extremely utilitarian objects at the same time of some attractiveness to the eye is not necessarily very expensive. The question is—Is even slight

additional attention justified? Because it appears profitable to work tin into more attractive shapes and paint it in gaudier hues, and to put able artists to designing bottles and packages for toilet goods, does it follow that more attractive designs for section houses and cars and engine terminals would pay as handsomely?

Increase in Highway Grade Crossings

IT is rather late to be reviewing statistics of accidents in 1926, but a bulletin just recently issued by the Interstate Commerce Commission discloses an important fact relative to accidents at crossings of railways with highways. This is that in 1926 there was an increase of 622 in the number of highway grade crossings in the country. The number of grade crossings eliminated in that year cannot yet be given, but whatever it was it was exceeded to the extent mentioned by the number of new crossings opened. The increase was due to the opening of new streets and roads over railway tracks. There is a constant demand from public authorities for railways to spend large sums in eliminating grade crossings and yet, at the same time, public authorities are constantly creating them faster than they are eliminated. The number at the beginning of the year 1925 was 232,710, while at the end of the year 1926 it was 235,158, a net increase in two years of 2,448.

The bulletin mentioned gives some other significant information bearing upon the subject. The number of persons killed at highway grade crossings in 1926 was 2,491. This is the highest figure yet reported and is an increase of 13 per cent over that for 1925. Motor vehicles were involved in 89 per cent of the accidents that occurred. The commission notes the remarkable fact that, "over one thousand accidents occurred in 1926 from the fact that vehicles or pedestrians ran into the side of trains."

No other industry has made a better record than the railways in reducing accidents due to causes under the control or influence of its management and the employees. In the ten years ending with 1926 the number of persons killed in railway accidents other than those at highway crossings was reduced from 8,349 to 4,459, or 45 per cent. The otherwise good record made has been marred by an increase in the number of persons killed at highway crossings from 1,652 in 1916 to 2,491 in 1926, or 45 per cent. The Supreme court of the United States, in a recent decision, has fixed upon the motorist the responsibility for accidents involving trains and motor vehicles at highway crossings saying that the motorist "knows that he must stop for the train, not the train for him."

Whether it be regarded from a legal or purely practical standpoint, the problem of highway crossing accidents is plainly one which must be solved chiefly by public authorities and the public, especially motorists, and not by the railways. One way in which its solution can be furthered is by reducing or stopping the constant increase in the number of highway grade crossings. Since about nine-tenths of the accidents at highway crossings involve motor vehicles, and since legal responsibility for them has been fixed upon the motorist, there seems reason to hope that public authorities and organizations of motorists may become more willing to give the railways the co-operation in reducing such accidents which has been so much needed in the past but which has not been forthcoming.



The Yard Locomotive That Made 4,400 Miles in One Month's Continuous Service

Triple-Crewing Yard Locomotives

Rock Island finds continuous operation of switching power productive of good results

By H. R. Fertig

Chief of Yard and Terminal Operations, Chicago, Rock Island & Pacific.

IN the past six months, the Chicago, Rock Island & Pacific has demonstrated conclusively that the working of yard locomotives over continuous extended periods of time is no longer in the experimental stage. As a matter of fact, it has been established as a standard practice on all yards of the system.

The three outstanding effects developed through the extensive utilization of yard locomotives are: reduction of fuel consumption through the elimination of fire knocking and boiler washings; reduction of running repairs through keeping engines in productive service rather than in enginehouses; and reduction of congestions at ash pits, turntables and in enginehouses, permitting more economic and expeditious handling of road power. Clearly, the fewer times engines pass over ash pits the less fuel will be dumped into the ash pit, and the fewer times engines are handled in enginehouses the lower the engine handling cost will be.

The real fuel question of any carrier is not how much fuel is actually consumed in producing energy, but how much goes out the stack as wasted gases or into the ash pit with the cinders and ashes. A modern yard locomotive operating on a heavy lead job will consume ten tons of coal in 24 hours, including coal dumped into the ash pit, when the engine is housed daily.

A conservative estimate of the coal wasted and consumed through dumping fires, filling the engine and again bringing it to serviceable condition, is $1\frac{1}{2}$ tons, or 15 per cent of the coal delivered to the engine during the 24-hour day; therefore, it is obvious that if the knocking of fires daily can be eliminated by proper care of the fire while the engine is in actual operation, proper care of the boiler by the engineer, and proper inspection and minor repairs made while the engine is being coaled, sanded and having the pan cleaned, there should be an appreciable saving in fuel charged to yard engine operation.

The General Plan

For a number of years the Rock Island has given the operation of terminals extensive supervision with the

view of reducing the cost of operation to the minimum through increased efficiency; it has been the policy to continue yard locomotives over two or more eight hour assignments when the hours of service permitted this being done. At the El Reno, Okla., yard this practice was carried out extensively with engines used in connection with passenger yard switching, yard engines were worked in continuous service for periods of from 10 to 20 days between enginehouse handling. At other yards where oil burning locomotives were in use, this plan could be carried out with more or less success, but not until 1927 did the plan become generally effective over the system and made a part of the standard practice of Rock Island yard operation.

Triple Crewing at Armourdale

The opportunity for increasing efficient operation in yards and terminals, especially in connection with the conservation of yard locomotives, reduction in enginehouse handling of yard power, and its effect on the coal pile, is clearly indicated in the following study of yard power utilization at Armourdale yard, Kansas City terminal. What is said of Armourdale yard can be said of all of the terminals on the Rock Island where continuous assignments over the 24-hour period permit the working of the same engine through the 24 hours for a number of consecutive days.

In November, 1927, there were 47 serviceable yard locomotives per day stored in this yard, compared with 22 per day in November, 1926, and the average mileage for all yard locomotives used in November, 1927, was 2,448, compared with 2,124 in November, 1926, an increase in mileage per engine of 15.2 per cent.

The accompanying chart shows the increased mileage secured from five yard locomotives which are used in continuous service on triple crewed assignments over continuous periods of time from 25 to 30 consecutive days each month. Attention is called to the mileage made by these five engines in October, 1927, compared with mileage made during same month of 1926, there

being an increase of 6,919 miles or 49 per cent. The November figures show an even better performance.

Table 1 shows the record of these five engines from the day they were started on the triple crew jobs to and including November 30. The engines are still in continuous service and have shown a percentage of productive service of 90.4 per cent, including the record of one engine which was out of service 17 days because of being damaged in a derailment in October. Eliminating this engine the productive service has averaged 95.4 per cent. No credits are allowed these engines for time out of service, the continuous record is broken if the engine is taken off the job for any repairs or where another engine is used for any time to protect the assign-

ment lost from 10 to 20 minutes. In a yard working 10 jobs this means a loss of from 2 to 3 hours per day changing crews. Under the double and triple crewing of engines the crews can be changed on the lead without loss of time to and from the enginehouse, which reduces the lost time per job so that there is now less transportation loss than before.

Inspection and Fuel Savings

Table 2 shows the average time consumed in handling triple crewed engines at the ash pits once daily during the lunch period of one of the crews, at which time the engines are given their daily inspection and attention. The average daily delay per engine was 32.6 minutes,

Table 1.—Utilization of Yard Locomotives

Kansas City, Mo.	300	301	Engines Used	302	303	304	Five Engines
Started triple crewing	9/10/27	9/26/27		9/26/27	9/26/27	9/26/27	
Days to Dec. 1, 1927	81.1	65.6		65.6	65.6	65.6	
Productive hours	1,841'05"	1,510'30"		1,501'30"	1,105'55"	1,503'40"	7,462'20"
Hours out of service	103'05"	66'50"		75'00"	671'05"	72'20"	787'20"
Productive service	94.7%	95.8%		95.2%	70.1%	95.4%	90.4%
Productive per day used	23'50"	23'45"		23'40"	22'50"	23'45"	23'25"
Period longest service	660'10"	532'30"		720'00"	508'40"	720'00"	
Longest non-productive	63'50"	24'10"		48'00"	405'00"	40'00"	
Times out of service	4	5		3	3	3	

*Note: Engine 303 damaged in yard derailment, out of service 14 days for repairs.
Engines continued in service in December, this record closed Nov. 30, 1927.

ment. It will be noted that two of these engines, Nos. 302 and 304, worked through the 30 day limit without being held out of service.

This performance has been accomplished without any change in fuel, water, yard or enginehouse conditions. The same quality of fuel is used now as was used in 1926 and former years; the water conditions during November of this year were the same, or slightly poorer, as in August this year and November last year, as is indicated in the following analysis furnished by the district chemist:

Armourdale Water	August		November	
	Treated	Raw	Treated	Raw
Hardness	1.2	12.0	1.5	16.5
Alkalinity	4.3	6.0	4.6	8.8
Causticity (Not doubled)	2.8	...	2.8	...

It is not expected that engines will perform over extended periods of time without having the same attention daily as they would receive by dispatching a relief engine to handle the assignment. The locomotives must have close inspection and immediate attention when adverse conditions arise or defects develop, but on the other hand, there is no more reason for housing a good hot, well steaming yard engine after 8 or 16 hours of service than in stopping one's watch when retiring for the night.

All of the locomotives working continuous assignments are taken to the ash pit once daily for inspection as required by law, and for coal, water and supplies. This is done during one of the lunch periods when it will best fit in with the enginehouse operations. At this time the engines are given close inspection, the pan is dumped, and, if necessary, some attention is given the fire.

No Loss of Operating Time

At first glance, many yardmasters maintain that the extensive use of power causes a loss of operating time as compared with the former method of changing engines each shift. What really happens under the old method is that the crew on the job is started to the enginehouse from 10 to 15 minutes before their eight hours are up so as to avoid overtime, the relief crew starts on pay at the enginehouse track where it gets its engine, it leaves on time with a switchman who has come for the engine and reaches the job 5, 10 or 15 minutes after the crew begins drawing pay, so that on each crew change under the old plan of changing engines at the enginehouse, each

or 12.6 minutes in excess of the time allowed the crew for lunch. The general yardmaster at Armourdale and the writer timed one engine during a noon trip to the enginehouse, and the elapsed time from the time the engineer got off the engine until he was back on it and leaving the enginehouse track was 25 minutes.

Table 3 shows a comparison covering fuel performance at Armourdale yard between October and November, 1927 and 1926. In October, 1927, there was an increase in the yard engine miles worked and a reduction of 1,193 tons of coal charged to yard locomotives, which reduced the consumption per engine mile worked from 150 to 108.3 lb. per mile. The record for November shows a better performance, the reduction being from 162.5 to 108 lb. per mile, 54.5 lb. or 33.3 per cent reduction under the same month of 1926.

The reduction in the number of engines handled in enginehouses is shown in table 4, which shows that the number of fires knocked or cleaned was reduced 50 per cent in November as compared with August, and that the number of yard engine boilers washed in November was reduced from 131 in August, 112 in September, and 84 in October, to 36 in November, a reduction of 72.5 per cent under August. One of the outstanding features of the triple crewing of power has been the elimination of congestion at enginehouses, with a resultant reduction in enginehouse expense for yard locomotives.

Table 2.—Cost of Handling Triple Crewed Yard Locomotives at the Ash Pit, October, 1927

Kansas City, Mo. (Armourdale Yard)	Labor Rate Per Hour	Time Consumed	Labor Charged To This Service
1 Machinist	\$0.7200	15 Mins.	\$0.1800
1 Machinist	\$0.7200	20 Mins.	\$0.2400
1 Hostler	\$0.7400	20 Mins.	\$0.2500
1 Hostler Helper	\$0.4100	20 Mins.	\$0.1400
2 Laborers	\$0.4100	15 Mins.	\$0.2200
1 Supplyman	\$0.4100	10 Mins.	\$0.0900
1 Laborer	\$0.3800	15 Mins.	\$0.1000
1 Laborer	\$0.3800	10 Mins.	\$0.0700
9 Men	\$4.1700	32.6 Mins.	\$1.2900

Table 5 shows the general effect on yard efficiency of working engines over extended continuous periods of time. Comparison is made between August, 1927, November, 1926, and November, 1927, and shows that it has been possible to reduce the engine assignment 12.8

per cent during November of this year compared with August, 1927, and 6.3 per cent during November, 1926, while the number of engines used to protect all jobs worked in November, 1927, was 33 per cent less than in August, 1927, and 26.6 per cent less than in November, 1926. Another feature to be favorably considered is the fact that the cars handled per day show a marked increase in November, 1927, also that all engines at this yard, instead of having fires knocked and boilers washed out each 417 miles worked as in August, 1927, and each 362 miles as in November, 1926, worked 1,353 miles between boiler washings in No-

sas City, Kan.) there are numerous industrial assignments which produce a low engine utility daily due to their location or the service rendered, preventing double or triple crewing such jobs. These jobs are usually protected by the smaller engines (S-29 class), one of the jobs in particular being in a location where nothing but a small engine can be worked, producing but one job per 24 hours. Such conditions naturally tend to reduce the general average of all engines used in the terminal.

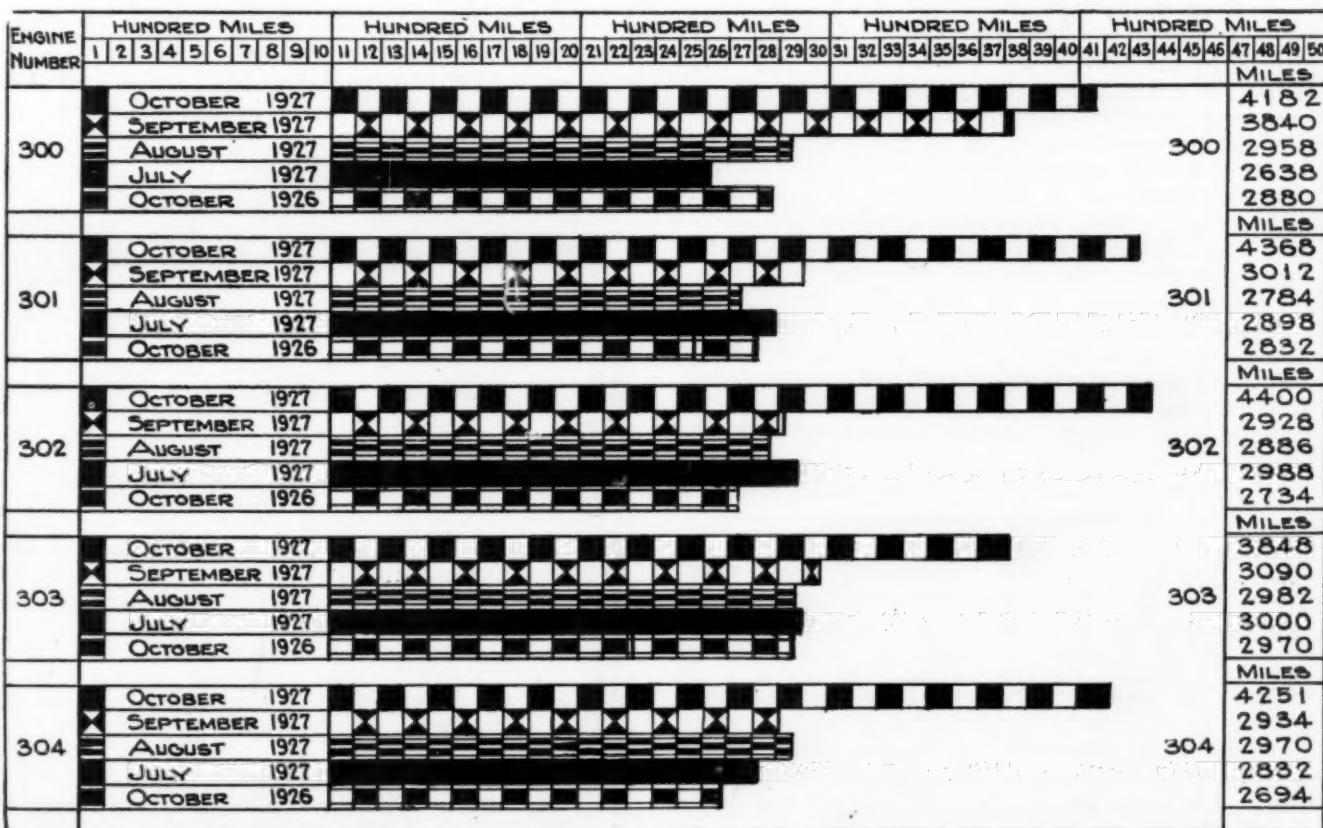
In computing these records no allowance is given for breaks in continuous triple crew jobs; on double crew

Table 3.—Comparative Statement of Fuel Consumption

Kansas City, Mo. (Armourdale Yard)	October 1926	October 1927	November 1926	November 1927	November 1927 vs. Nov. 1926
Total Yard Engine Miles	46,992	47,604	45,198	46,028	1.8% Inc.
Total Jobs Worked	1,033	1,045	996	1,015	1.8% Inc.
Total Tons Coal Consumed	3,794	2,601	3,860	2,687	30.4% Dec.
Tons Coal Per 8 Hours	3.6	2.6	3.9	2.6	33.3% Dec.
Pounds Per Engine Mile	150.0	108.3	162.5	108.0	33.3% Dec.

vember, 1927. This large saving is further borne out by the fact that in November, 1926, there were no serviceable yard engines stored in this yard while in November, 1927, there was a stored energy equivalent to

jobs, owing to the nature of the assignments, credit is given for double crews when there is a break of not more than one hour between the ending of one job and the starting of the next job on which the engine



Yard Engine Performance: Showing Increased Engine Mileage Through Triple-Crewing Switching Engines

16.8 per cent of the total engines available daily.

Table 6 shows the productive service secured from all classes of power during the month of November, 1927. At all terminals of any importance, (Armourdale furnished service to Kansas City, Mo., and Kan-

is used. Breaks of more than one hour are charged as single jobs, although the engine may have been worked or two or more assignments within a 24 hour spread.

From Table 6 it will be noted that during November there were 144 unbroken 24 hour triple crew jobs worked

Table 4.—Reduction in Engine Handling in Enginehouses

Kansas City, Mo. (Armourdale Yard)	August 1927	September 1927	October 1927	November 1927	November Compared With August 1927
Engines Over Turntable	844	582	545	577	31.6% Decrease
Number Fires Knocked	201	133	109	87	56.6% Decrease
Fires Cleaned Only	273	351	157	149	45.4% Decrease
Total Knocked-Cleaned	474	484	266	236	50.0% Decrease
Number Boilers Washed	131	112	84	36	72.5% Decrease
Total Engines Dispatched	1,961	1,515	1,247	1,303	34.5% Decrease

in the yard, 126 of these being worked by the five large engines which are assigned to the train yard leads and 18 worked by engines smaller than the S-29 class. The larger engines, naturally, make better mileage as they are on matched assignments, and during November produced an average of 23 hr. 30 min. productive service per day used which, with the other engine used, gave the terminal 16 hr. 20 min. per engine used per day as compared with 11 hr. 30 min. per day in November, 1926. In November, 1927, the daily average of 32 jobs was worked with 16 engines compared with 32 jobs with 23 engines in November, 1926.

These results were obtained through co-operation between the transportation and mechanical departments in the terminal, and through the interest and support of the employees. As with all new methods of operation the success of the plan lies most in the reception

Moisture Change in Lumber Shipped in Box Cars

THE accompanying diagram from the U. S. Forest Products laboratory, Madison, Wis., shows the moisture changes that took place in the lumber in various parts of the car while five carloads of Douglas fir clears were in transit from western Oregon to Chicago. Shipment was made in the relatively wet weather of late winter and early spring in box cars in good repair.

The average moisture change for the five cars of lumber was a gain of 0.2 per cent. The maximum moisture change recorded at any position in the cars was a gain of 0.8 per cent. The average moisture content of the entire shipment on receipt was 8 per cent.

Table 5.—Increased Efficiency of Yard Locomotives

Kansas City, Mo. (Armourdale Yard)	August 1927	November 1926	November 1927	November 1927 vs. Aug. 1927	Nov. 1926
Assigned Engine Days	806	750	703	12.8%	6.3% Dec.
Engine Days Used	740	690	496	33.0%	26.6% Dec.
Number Jobs Worked	1,100	963	979	10.8%	1.9% Inc.
Total Freight Cars Handled	105,884	86,834	95,521	18.0%	10.0% Inc.
Cars Per Engine Per Day	143	126	184	25.0%	31.5% Inc.
Hours Per Engine Per Day	12'20"	11'30"	16'20"	24.5%	41.7% Inc.
Miles Between Boiler Washings	417	362	1,353	224.0%	273.0% Inc.
Surplus Serviceable Engines .....	.6%	0.0%	16.8%	.....	.....

given it by the local officers and employees. The Rock Island has enjoyed very close co-operation between the local representatives and the employees directly interested in the operation, in all of the undertakings to further economic operation in our yards and terminals.

The economic use of power appeals to an interested engine crew as they know that by continuous use of these engines each man handling them will give them closer attention. The fireman, knowing that he will get the same engine on his next shift, takes pride in delivering the fire to his relief in as perfect condition as he expects it to be delivered to him; the engineer knows he will have the same engine each shift; consequently, knowing the engine will not go to the house, he sees that the boiler is blown out, and water handled so that

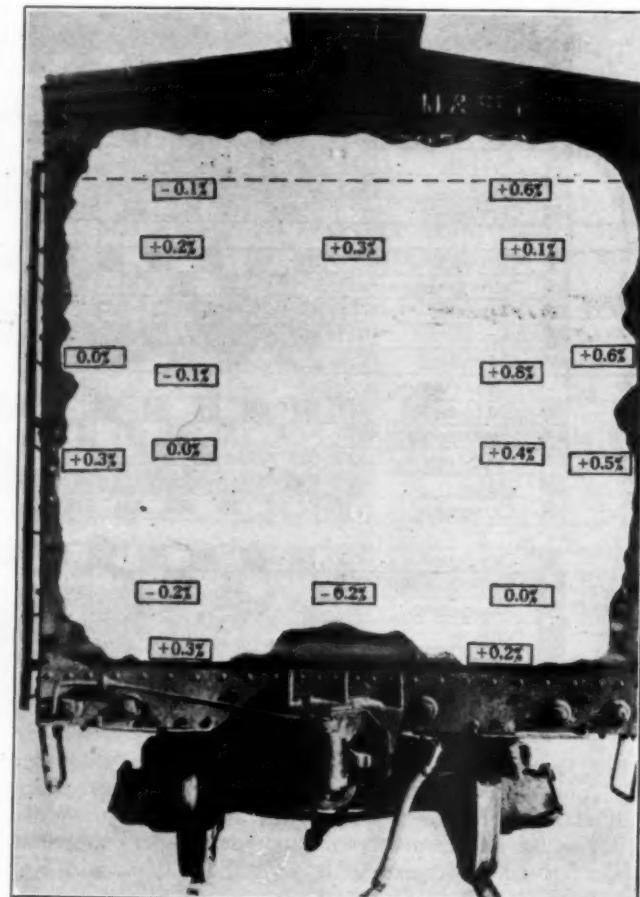
Table 6.—Productive Service Secured from Yard Locomotives
of Each Class, November, 1927

Kansas City, Mo. (Armourdale Yard)	S-53	S-39	S-33	S-29	Number Used
T.P.	T.P.	T.P.	T.P.		
Number engines each class ..	5	11	1	4	21
Number days engines used ..	131	276	16	73	496
Triple crewed jobs worked ..	126	18	0	0	144
Double crewed jobs worked ..	4	7	12	28	119
Single crewed jobs worked ..	2	249	4	52	307
Total eight hour jobs	388	394	38	108	928
Productive hours per day	23'30"	14'10"	14'10"	12'15"	16'20"

there will be an elimination of foaming and raising of water. If there are any defects apparent which can be attended to while the engine is in for coal and inspection at the ash pit, he sees to it that these defects are reported, and, according to the degree of his interest, he goes with the engine to the inspection track and discusses with the inspectors, the machinists and helpers, just what can be done without loss of productive service, to keep the engine in good working condition. All of this results in the engine being kept in serviceable condition without having to be taken out of service and put in the enginehouse.

Every man takes pride in the accomplishments at Armourdale. This was shown clearly on October 28, 1927, when engine 303 came in after being damaged in a derailment. Every enginehouse employee as well as the supervisors showed that having one of the locomotives crippled on the job meant a personal loss to them.

It is apparent that when lumber is shipped close piled in close, tight-roofed box cars the shipper may feel assured that it will reach its destination without serious



How the Moisture Content Change Varied in Different Parts of the Load

loss or gain of moisture. The findings of the Forest Products Laboratory study would not be expected to hold for lumber shipped in open cars, or in box cars having leaky roofs.



Arcola, Miss., One of Many Stations Submerged During the Flood

The Work of the Railways in the Mississippi River Flood*

An abstract of a statement presented before the Congressional Flood Control Committee on November 28

By A. F. Blaess,
Chief Engineer, Illinois Central System, Chicago

THE Mississippi river flood of 1927 establishes another record in the long line of unprecedented floods on that historic stream, as gages show stages higher than ever before recorded, while breaks in the levees inundated approximately 18,000 square miles of land, directly affecting three-quarters of a million people; making approximately 600,000 homeless and destitute and causing property damage which in the aggregate is estimated to exceed \$300,000,000. Operation was suspended from 10 to 120 days on 3,000 miles of railroad (the longer period applying principally to branch lines) while the physical damage to the railroads has been estimated at \$10,000,000. The inundated territory included more than 100 counties and parishes in seven states, the total area of which is almost equal to that of New Hampshire and Vermont.

Mississippi floods have caused extensive damage to railroads for the past 45 years, the damage increasing as the roads were developed and extended. In 1880 there were only about 200 miles of railroad in the alluvial delta. The development of the valley was followed by extensive railroad construction, and at the present time nearly 4,500 miles of railroads traverse the territory subject to overflow. Each succeeding flood has seriously interrupted freight and passenger traffic and the movement of mails; telegraph and telephone lines have been destroyed and all communication often entirely cut off.

* This statement supplements a similar report prepared by the American Railway Engineering Association, which was abstracted in the issue of September 17, page 511.

The 1927 flood, in common with all previous Mississippi river floods, caused the greatest damage in the lower Mississippi valley. This alluvial delta is nearly 600 miles long and averages about 50 miles in width and is traversed by railroad lines in every direction.

Thirteen railroads were either seriously damaged by the flood of 1927 or put to heavy expense to maintain such service as was possible under the existing condition, and while the figure of \$10,000,000 has been established as the approximate cost of the physical damage—including the cost of protective measures—it will not cover the increased cost of maintenance of repaired tracks following the restoration of service. It is impossible even to estimate with any degree of accuracy the further damage to these roads which has resulted through the delay and loss of traffic, the cost of trains furnished for rescue and relief service and of detouring over other lines, or the ultimate effect upon railroad business through the damage occasioned by the loss of crops and general interruption to business adjacent to these railroads.

The Nature of the Damage

As previously stated 3,000 miles of railroads were put out of service by the flood, of which approximately 2,000 miles were covered with water, and 1,500 miles damaged to a greater or lesser extent. The greatest damage to the railroads in the valley was on the west side of the river, as all of the breaks in the levee occurred on that bank with the exception of the Mound Landing break and the artificial crevasse at Caernarvon. The damage

to railroads on the east side of the river was chiefly in the Yazoo basin which was flooded by the Mound Landing crevasse, which inundated 316 miles of tracks on the Illinois Central and 40 miles on the Columbus & Greenville. Breaks in the levee on the west bank of the river inundated approximately 1,500 miles of railroad, damaging from 1,000 to 1,200 miles.

If one can imagine water covering 374 miles of track, damaging 269 miles, making it necessary to crib a total of 34 miles, drive 3 miles of trestle, reballast 118 miles, reline 98 miles and resurface 130 miles on a single road having less than 600 miles of track out of service, he will gain some idea of the total effect upon 3,000 miles of road.

The equipment and forces used in making repairs to the Illinois Central will give some indication of the amount of equipment and the number of men required on all the roads affected. This road used 12 pile drivers, 3 derrick cars, 12 to 15 switch engines and over 1,000 camp cars, together with hundreds of motor cars, motor boats, hand cars, push cars, etc. The maximum force engaged in flood work on the Illinois Central was 5,000 men. This included 422 bridge men and 2,339 section men but did not include 516 men engaged in levee protection south of Baton Rouge. The supervisory force was composed of division and general officers.

Material Handled

The material furnished during the flood comprises so many different articles that only a few of the most important items can be mentioned. Included in the Illinois Central list were 128 boats, hundreds of rubber boots and raincoats, 27 outboard motors, over 2,000,000 levee bags, 219,800 lin. ft. or 40 miles of piling, 12,840 lin. ft. of 12-in. by 14-in. caps for bridges alone, with perhaps an equal amount used for cribbing, 86,708 lin. ft. of 7-in. by 16-in. stringers for bridges and 25,000 lin. ft. used in cribbing, 215,700 cu. yd. of ballast and 192,000 cu. yd. of filling.

The rescue and relief work performed by the railroads was truly first aid, as they were not only on the scene immediately after the breaks occurred in the levees but had made preparation for relief and evacuation prior to the breaks. For example, the Yazoo & Mississippi Valley placed passenger equipment at such strategic points as Greenville, Cleveland and Rolling Fork, Miss., to facilitate the prompt evacuation of the area subject to inundation.

Prompt Relief Operation

The Mound Landing break in the east levee just north of Greenville, Miss., occurred at 7:30 a. m., April 21. At 7:35 a. m. the news of the break was received in the office of the general superintendent of the Yazoo & Mississippi Valley at Memphis. Rescue trains began to move at once and within two hours 25 relief trains were either in the vicinity of the break or enroute. Regular passenger trains were turned back to the flooded territory while locomotives were taken from freight trains and relief trains made up of passenger equipment which had been held for this purpose. These trains were in constant service to and from the flooded area until all refugees had been rescued.

The number of lives saved and the amount of suffering prevented by this prompt action on the part of the railroads will never be known but there is no doubt, particularly in the minds of the people of the valley, that the railroads were one of the most important agencies of relief throughout the duration of the flood and undoubtedly the principal factor in relief work immediately after the breaks in the levees, as the entire railroad organiza-

tion was directed toward rescue and relief, and it could and did act before other organized agencies were on the ground.

Value of Service

The value of free service rendered by the railroads in the 1927 flood has been estimated at more than \$3,000,000. The Illinois Central alone operated 311 rescue trains and handled 46,381 refugees. It also furnished 1,674 cars to be used for living quarters, some of which were occupied for more than 60 days; 892 cars of household goods and 759 cars of livestock were moved, all free of charge. Moreover, it transported free of charge 1,294 cars of food, clothing, supplies, etc., for the relief and rehabilitation of the residents of flooded areas, and hundreds of carloads of boats and airplanes, tents, seeds and other supplies. The value of the free service rendered aggregated about \$450,000.

The relief work performed by the railroads of the valley did not end with the recession of the flood waters. They have since assisted in the promotion of every important reconstruction and reclamation project. In addition to contributing funds, the railroads have transported free of charge, food, clothing, building materials, supplies, etc., necessary to assist the stricken people in the rehabilitation of their homes. Agricultural experts from the railroad staffs have assisted and directed the farmers and planters in the reclamation work. Railroad medical staffs have also co-operated with state and local authorities in directing public health movements.

Accident Bulletin No. 95 Is Issued By I. C. C.

THE Interstate Commerce Commission has issued accident bulletin No. 95, a pamphlet of 116 large pages, containing in great detail the record of collisions, derailments and other accidents occurring on the railroads of the United States during the 12 months ending with December 31, 1926. The principal totals in this bulletin were published in a preliminary statement which was noticed in the *Railway Age* of May 7, last, page 1402. That statement was issued subject to correction. The only error that we note is in the total number of employees killed in train service accidents, which is 1102, instead of 1105. With this correction, the total number of persons killed, all causes, was 7,090, and of injured, 130,235.

No marked increases or decreases appear in this record as compared with the year 1925.

The total damage to railroad property in train accidents in 1926 was \$22,185,306; almost exactly the same as the total in the preceding year. A summary statement of train accidents shows:

	No.	Damage to railroad property	Killed	Injured
1926—Collisions	5,572	\$5,902,391	152	2,319
Derailments	12,606	14,557,654	141	1,362
Other	2,899	1,725,261	67	235
Total	21,077	\$22,185,306	360	3,916
1925—Collisions	5,166	\$5,502,468	124	1,762
Derailments	12,759	15,057,949	226	1,911
Other	2,860	1,589,040	68	239
Total	20,785	\$22,149,457	418	3,912

The number of highway crossings on the railroads of the United States on December 31, 1926, was 234,280, of which 206,433 are classed as unprotected.

Importance of Locomotive Assignment*

Power should be assigned to meet requirements in each division—Relative maintenance costs a large factor

By H. J. Titus

Transportation Engineer, Franklin Railway Supply Company, New York

FOR convenience of study, operating expense may be classified under the four general headings of maintenance of way and structures, maintenance of equipment, transportation and general. From an analysis of the various items of expenditure, it is found that the tendency of certain items is to remain constant, regardless of the volume of business handled, while other items show a wide fluctuation with the business. From a study of the Interstate Commerce Commission statement of railroad expenses for 1925, it is found that of the total operating expenses, 17.8 per cent were expended for maintenance of way, 27.7 per cent for the maintenance of equipment, 50.5 per cent for conducting transportation, and 4 per cent for the general expense.

Further analysis shows that during the period from 1916 to 1925 the relationship of the transportation expense to the total expense shows a decreasing tendency, whereas the other items show an increasing tendency. Knowing that certain items of the operating expense are constant, whereas others are variable, the expenses for the 1925 operation were approximated and divided between these two classes of expenditure. The total maintenance of way expense comprises 17.8 per cent of the total operating expense. Of this amount 39 per cent is variable, whereas 61 per cent is a constant expenditure. The maintenance of equipment expense, amounting to 27.7 per cent of the total operating expense, shows that 79 per cent of this expenditure is of a variable nature, and 21 per cent constant. The expenditure involved in conducting transportation amounts to 50.5 per cent of the total operating expense, with 67 per cent of a variable nature, and 33 per cent constant. The general expense, amounting to 4 per cent of the total expenditure, is of a constant nature. From these data it will be observed that approximately 37.1 per cent of the operating expenses are of a constant nature, while 62.9 per cent are variable, depending, more or less, on the volume of business. These data indicate the approximate division of the operating expense. From an inspection of the various items making up the constant expense, such as superintendence, taxes, insurance, despatching trains, interlocking plants and crossing protection, it is found that the constant expense items do not present a very fertile field for economy. The best promise of economy lies with the variable expenditures. Of the various items it is found that the item of transportation, having 67 per cent of the expense of a variable nature, offers the most promising opportunity for economy, while the maintenance of equipment expense, having 79 per cent of the expense of a variable nature, is second in importance.

Considering first the transportation expense, it is found that the direct expense of conducting transpor-

tion, which is of a variable nature, and includes wages, fuel, water, lubricants, train and locomotive supplies, and enginehouse expense, for yard and road service in 1925, constituted approximately 60 per cent of the total transportation costs, and 89 per cent of the variable cost. While the figures given are representative of the 1925 performance, it is found that during the ten year period, from 1916 to 1925, approximately the same relationship existed. For road service alone, these direct expenses of transportation amount to approximately 45 per cent of the total expense of transportation, and 67 per cent of the variable expense as related to transportation. Therefore, for introducing economy in the transportation expense it appears that the direct expenditures for road service should receive first consideration, with the yard service direct expense of secondary importance.

Study Various Elements

Thus, in order to obtain the most economical operation, it becomes necessary to study seriously the various elements of operation which affect the direct transportation costs as a whole, or the principal elements thereof. There are, of course, several elements, such as power of locomotives, length of division, length and percentage of ruling grade, curvature, location and extent of facilities such as water tanks and sidings, the class of business handled and the flow of tonnage through terminals, which must be taken into consideration.

After investigating all of the items which affect an economic operation, it will be found that the study points to power as the most important item.

From a glance at the variable transportation expense, it will be observed that all of the direct expense items, except fuel, are practically constant for each train unit, regardless of size and weight. Fuel will depend, to a great extent, on the train load. Therefore, to obtain the greatest economy per ton-mile handled, it becomes necessary to consider increasing train loads, thus decreasing the number of train units and train miles to do a given amount of work. This may be accomplished in either one of two ways, or a combination thereof. Maximum grades may be reduced, thus permitting heavier train loadings, or the power of the locomotive may be increased, thereby producing the same results. In any event, it becomes a necessity to consider the type and power of the locomotive to be assigned to a particular division, so as to obtain the maximum results. Also from an analysis of the direct expense, it will be observed that the items of fuel and enginehouse expense make up a large percentage of the total direct expense. Therefore, in considering the type of power it becomes necessary also to consider the various fuel and labor saving devices which may be applied to a locomotive.

In 1925 the majority of the maintenance of equipment

* Abstract of a paper read before the December 13, 1927, meeting of the Canadian Railway Club, held at Montreal.

expense was divided between the items of maintenance of locomotives, freight cars and passenger cars. Of the total expenditures for maintenance of equipment 36.5 per cent was for locomotives, 29.5 per cent for freight cars and 7 per cent for passenger cars. During the past ten years, there was only one year in which the maintenance expenditures for freight cars exceeded that for locomotives. The expenditures for locomotive maintenance varied from 32 per cent to 40 per cent of the total maintenance of equipment expenditures over the period of the last ten years, while freight car maintenance has varied from 29 per cent to 37 per cent of the total expenditure for maintenance during the same period. The tendency of the percentage relationship of these items of maintenance expenditures have been downward during the past three years, the percentage of the total expenditures obtained in 1925 being nearly equivalent to that obtained in 1916 in the case of locomotive maintenance, and less than that obtained during the same period in the case of car maintenance. Thus, with a decreasing ratio of maintenance of equipment expense to the total operating expenditures, and a decreasing tendency in the ratio of the principal items to the total of the maintenance of equipment expense, it is obvious that marked economies in these expenditures are being effected.

In general, the tendency to increase the unit power of the locomotive, thereby making it possible to handle a greater volume of business with a less number of locomotive miles, naturally reflects itself in a reduction in the maintenance expenditures for locomotives. Individually, the maintenance expenditures for locomotives will depend on the class of service to which they are assigned, the physical characteristics of the road and the number and size of drivers required for the same power output. These items all influence the maintenance cost of locomotives.

Wide Variation

In one instance, with several designs of locomotives operating in the same class of service over the same territory, it was found in taking the average maintenance expenditures for a number of each class, that there was a wide variation in these maintenance costs. The locomotives, while of different design, were of approximately the same age; therefore, the variation in maintenance expenditures for the different classes of locomotives were not because of age, class of service or physical characteristics of the road, as all of these were constant, but did vary because of the locomotive design. The design of those locomotives did not include auxiliaries such as feed water heaters and stokers, but the Mikado class was equipped with a booster and, therefore, due allowance should be made for the booster maintenance. The results showed that for a number of locomotives of each class the average maintenance cost per locomotive mile did vary with the design as follows:

Mallet type	52 cents per locomotive mile
2-10-2 type	48 cents per locomotive mile
Light Mikado type with booster.....	27 cents per locomotive mile

In another instance sufficient data as to the maintenance expenditures were available for a number of two classes of locomotives. In this case the locomotives, being of practically the same age, were operated in a similar class of service over the same territory, although these locomotives were actually designed for different classes of service. Also in this case all the elements effecting locomotive maintenance were constant, except the element of design. One locomotive was of the Pacific type, while the other was of the Consolidation type. The average maintenance cost for a number of the Consolidation type locomotives was \$.30 per locomo-

tive mile, whereas for several Pacific type locomotives it was \$.19 per locomotive mile.

Factors Affecting Power Assignments

Because of the variation in locomotive maintenance costs with the type of locomotive, the assignment of locomotives to a particular division or class of service becomes a very vital subject, not only from a transportation expense item, but also from a maintenance of equipment point of view. Thus, before an assignment is made, a thorough study should be made as to the economic value of a particular type of locomotive for the work necessary. An analysis of this character should apply to all classes of service, such as through freight, local freight, branch line, passenger and yard service. Each class of service is a problem in itself, and it will be seldom found that a locomotive which produces economy in one service will exactly meet the requirements of another class of service.

In the assignment of power to a territory, for the purpose of handling freight trains, there are several important items which must be considered. Of primary importance is the item of traffic. Is the traffic in sufficient volume so that full tonnage trains may be handled with the class of power which is in use at the present time? With a more powerful locomotive, would it be possible to obtain the same relationship between the actual tonnage handled and the rated tonnage?

In other words, is there a sufficient tonnage available at the terminals at all times, so that it will not be necessary to run partially loaded trains? Of secondary importance comes the physical characteristics of a division. Are they such that maximum train loads may be handled with due despatch? Are the maximum grades of great length, or are they short so that they may be considered as velocity grades? Are the physical characteristics such that the maximum gross ton miles per train hour can be produced at the present time with the existing power, and can this rate of production be improved with a more powerful locomotive? With conditions which justify retaining the same power per unit, would it not be possible to obtain a more economic operation with a locomotive of different design, with supplemental power produced through the use of the locomotive booster? On the other hand, if an increase in the power per unit is justifiable from the economic standpoint, should this increase in power be provided with new locomotives through the medium of increasing the number of drivers, or weight on drivers, with a consequent increase in the total weight of the power unit and cost thereof, or should it be obtained with the existing locomotive and the locomotive booster? This is especially pertinent in view of the fact that the capital expenditure involved will be at least six or eight times greater in the case of new power. These are some of the questions which must receive consideration in procuring and assigning power to produce the most economical operation.

The Importance of Differences in Maintenance Costs

On one road data relative to individual locomotive maintenance expenditures have been obtained for several years. Recently these data proved to be very valuable in determining the costs of operation for one class of service, and were used in determining the economic advantages that could be realized from this service by employing a different design of locomotive. The service referred to was of the preferred class and, consequently, demanded high speeds. Originally this service was handled with a Pacific type locomotive which had

ample power adequately to handle the business offered, as it came from the connecting lines. As time went on, this business was gradually expanded until the trains delivered by the connecting lines could no longer be handled in one train unit with the Pacific type locomotive. If it were desirable to continue using Pacific type locomotives in this service, the trains as delivered would of necessity either be divided into two trains, or else doubleheaded. In either event, the cost of the operation would be increased. Therefore, it was decided to employ a locomotive of different design, which had ample power to handle in one train unit the business as it came from the connecting lines. This move naturally lowered the unit cost as a whole, because of the larger tonnage per train unit. After these locomotives had been operating in this class of service for a considerable period of time, an analysis and comparison was made of the average maintenance costs of the locomotive used in this service.

From this investigation it was found that instead of obtaining an average maintenance cost of \$.19 per locomotive mile, as was obtained with the Pacific type locomotive, the maintenance cost had increased to \$.30 a mile for the same operation when the Consolidation type locomotive was used. This represented an increase of 58 per cent in the maintenance locomotive cost for the same service rendered.

Discovery of this fact led to a study of local conditions, to determine whether or not a successful operation could be obtained with the Pacific type locomotive equipped with the locomotive booster, it being believed that economy from operation could be obtained. The result of the investigation showed that the Pacific type locomotive equipped with the booster would develop the same starting capacity as the Consolidation type locomotive, with a slight deficiency in power at eight miles per hour. At a speed of 25 m. p. h., or greater, the Pacific type engine proved to be the better engine. The conditions which govern the loading of these engines are that the engine must start the train on the ruling grade, and that schedules must be maintained. These conditions could be adequately met with the Pacific type engine equipped with the booster.

Booster Adds to Maintenance

The application of a booster will, of course, increase the maintenance costs to a slight extent because of the necessity of maintaining additional equipment. This cost for maintaining the booster, which furnishes 25 per cent of the total power of the locomotive and booster, only amounts to one-half cent per locomotive mile, which is almost negligible in comparison with the locomotive maintenance cost, being merely 2.6 per cent of the cost for maintaining the Pacific type locomotive. Thus, the saving realized in this case with the same work performed is the difference between \$.30 a locomotive mile for maintaining a Consolidation type locomotive, and \$.195 a locomotive mile for the booster equipped Pacific type, giving a saving of \$.105 per locomotive mile in favor of the operation with a Pacific type locomotive equipped with the booster. Was this a worth while saving in view of the fact that this one service required over 400,000 locomotive miles annually?

On another road the volume of business had steadily been increasing to such an extent on one subdivision, that greater tonnage per train was brought into the terminal than could be handled over the particular subdivision with the power at their disposal. Therefore, it was necessary to operate more train units than was formerly the case. The officers realized that a more powerful locomotive unit would make it possible to reduce

the train units and, consequently, the train miles, and thus re-establish the balance between the subdivisions. In addition, greater unit power would make it possible to decrease the unit costs of operation. It developed that consideration was given to a 2-10-2 type locomotive, or the equipping of their existing Mikado type locomotives with the locomotive booster.

Costs for Types

With the 2-10-2 type locomotive which was considered, it would have been possible to increase the train load by approximately 500 tons, whereas with the Mikado type equipped with the booster the train load would be increased by 400 tons. Offhand, it would appear that the 2-10-2 type locomotive would prove to be the more economical of the two because of the greater load which could be handled. This road, however, made a very thorough analysis of the situation to determine which method of obtaining the greater unit power would prove the more beneficial. Careful estimates involving the principal items of direct expense, including maintenance, fuel and wages, and enginehouse expense, were made for the operation, both with a 2-10-2 type locomotive and the Mikado type with a booster. It was believed that the train and locomotive supplies would be approximately the same in both cases. It was found from these estimates that, whereas the existing operation was costing 73.4 cents per thousand gross ton-miles for the direct transportation expense and locomotive repairs, the estimated operation with the Santa Fe type locomotive would cost 64.2 cents per thousand gross ton-miles, and the operation with the existing power equipped with the locomotive booster would cost 61.1 cents per thousand gross ton-miles. In other words, the maintenance cost of the 2-10-2 type locomotive offset, to a certain extent, the savings that could be realized from greater train loading. The road naturally chose the operation giving the least costs. Ten locomotives were equipped with the locomotive booster and placed on the sub-division, where twelve locomotives were necessary previously, so that a thorough test might be made to determine the economic advantages. The operation with these engines was closely watched, but no statistical data was obtained until these engines had been in operation for a considerable period of time, it being believed that certain conditions would have to be re-adjusted before the maximum economy could be obtained.

Train Mile Costs Increased

The data obtained during a test period showed, when compared with the operation during a similar period when there were no boosters, that the train-mile costs had increased from \$1.409 to \$1.456 per train mile. The operation during the period with the increased power required 30,555 train miles to handle 73,432 thousand gross ton-miles, while with the previous operation it had required 39,270 train miles to handle 75,428 thousand gross ton-miles. Thus, while the cost per train mile was increased by 3.3 per cent the unit cost per thousand gross ton-miles for this operation was reduced from 73.4 cents to 60.5 cents, a saving of 12.9 cents per thousand gross ton-miles. This is equivalent to a reduction of 17.6 per cent in the unit costs of operation. The use of this increased power on this sub-division certainly was justified.

These are two examples of how railroads have benefited from an economic study involving the assignment of power, the one obtaining economy through the medium of decreased maintenance expense by employing the use of a different type of locomotive, while the other road

found that an increase in the power per locomotive unit made it possible to decrease the direct transportation expense and maintenance expense of the locomotive, when considered on the unit basis of the gross ton miles handled.

The question naturally arises as to the assignment of locomotives for other types of operation. What about the operation in freight service, which has heavy power assigned to a division, over which it is impossible to utilize over 65 per cent of the power, except occasionally, because of the local conditions and the nature of the business handled? Does this excessive power with the locomotive weights which are involved tend to improve the efficiency and economy of the operation? Would it not have been more economical when this road purchased this power, to have obtained a locomotive with less weight and a less number of drivers, thus obtaining a locomotive which would handle approximately 100 per cent rating, and show an economy in maintenance as against the existing locomotive, especially in view of the fact that because of the physical characteristics of the road, the train load does not materially affect the speed of operation. In a case of this description the officers, of course, are counting on the future business, but is it not possible that Old Man Future's stepson, Obsolescence, will run a faster race? It may be possible that when sufficient traffic is available for full train loads, the present locomotive will have become obsolete. The trend in power design during the last few years proves that locomotives built only five years ago have been superseded by later designs which tend to make the older locomotives obsolete. It would therefore appear that a locomotive should be built for today's operation, with a slight margin for the future, but never the margin permitted with 65 per cent of the locomotive rating for the present operation.

Locomotive Service Other Than Freight

So far mention has only been made of freight service, but what about the passenger service and service rendered in the yards and terminals? Do these types of service not justify the same study and consideration as freight service?

It would appear that the assignment of the proper type of locomotive which would handle the situation the most economically would be advisable.

On a number of roads increased passenger traffic, together with the steel cars now in use, have in many cases made good locomotives obsolete for main line service because of insufficient power to handle the heavy trains. In these cases it has become necessary to obtain supplemental power in order, in the majority of cases, to start trains properly. The supplemental power, in some cases, was obtained through the medium of an increased number of drivers and increased weight of the locomotive. It would appear that in this case the same as in freight service, through a study of local conditions, it might be possible to obtain an economy because of locomotive design, and let the locomotive booster give the necessary supplemental power rather than increase the number of drivers or weight on drivers.

On many roads today the yard service inherits the locomotives from road service. When more power is needed for yard locomotives the engines assigned, while more powerful and with a greater number of drivers, are usually of an obsolete design for road service and, consequently, no longer prove economical. Therefore, the yard must use these locomotives until such a time as depreciation permits their removal. Is this really in the interest of economy? A desirable yard engine should not only be considered from the angle of the number of

cars it will handle, but also from the maintenance standpoint. Would it not be economy in this service to use a specially designed six-wheel switcher, using the booster for the necessary increased power in preference to an eight-wheel switcher or a Consolidation type locomotive inherited from road service?

One road believes that a specially designed switcher for yard service would be the more economical. After a thorough analysis of their local conditions this road decided to employ a six-wheel switcher because of track conditions. With the increased train loads being handled in road service, it was desirable to obtain a switcher locomotive having sufficient power to handle the train units being brought into the terminals with the road engines.

Thus, it was desirable to have an eight-wheel switcher, but track structures making it undesirable, this road considered and finally applied the locomotive booster to the tender of the six-wheel switchers. This gave ample power to handle trains brought into the terminal. It was believed that this method of obtaining increased power would prove the most economical because of the difference in maintenance costs and the possibility of working the locomotive itself to better advantage. The indications are that this yard locomotive is far superior to any other now in use on this road, showing savings in the expense per car handled and in the maintenance expense of the locomotive.

The Factor of Investment Costs

Considering all the classes of service, there is one important factor common to all which will have a bearing on the economic situation. This factor is the investment costs. In a study relative to the assignment of locomotives it may be possible that savings may be effected, because of decreased maintenance costs of one type of locomotive in preference to another type of locomotive, or because of the possibility of reducing the unit cost with the use of greater power per locomotive unit. In accomplishing this, however, these savings may be offset because of the investment costs. These carrying charges, or the investment costs, are constant. The investment costs per locomotive mile will depend on the annual mileage made with the particular locomotive.

With a class of business requiring the intensive use of a locomotive for only a short period of time, the investment costs per locomotive mile operated naturally will be excessively high, while on the other hand, locomotives used in constant operation show low investment costs per locomotive mile. Thus, when additional power of locomotives is justified because of the possible decrease in the direct operating expense, it would appear that a study of the investment costs should be made to determine whether new locomotives costing six or eight times the cost of the booster would prove more economical than the existing locomotives equipped with the locomotive booster.

In the assignment of a locomotive to any class of service, there are several outstanding factors that will have a marked bearing on the economics of the operation. With a proper relationship between the traffic and power of locomotives, it is essential that the locomotives giving the required amount of power with the least number of drivers, be used so that a minimum expenditure for maintenance of equipment will be required. A balance between train load and train speed must be obtained so as to obtain an operation giving the greatest production rate with the least unit cost possible. The required power output of the locomotive must be obtained with a minimum of investment costs.

Kansas City Southern Directors Elect C. E. Johnston President

Job A. Edson, after 60 years' railway service, will assume title of "president retired" on January 1

CHARLES E. JOHNSTON, vice-president and general manager of the Kansas City Southern, was elected president on December 29, to succeed Job A. Edson who will retire on January 1. Mr. Edson, who is 73 years of age, will retain a connection with the company under the title of "president retired."

Mr. Johnston has grown up with the railroad. Since his first connection with the K. C. S. as a locating engineer in 1908, he has had a share in its development from a hurriedly constructed railroad—many sections of which were adapted from logging roads built for local

as soon as it had inaugurated operation as a through line. It was most often characterized as a line that had been allowed to "run down and rust out."

Under Mr. Edson's leadership, the improvement was rapid. The 12 months ended June 30, 1907, covered a period in which the railroad not only found itself but obtained the most favorable operating results in its history up to that time. The management in that year increased net earnings 83 per cent and net income 163 per cent over the previous year and reduced the operating ratio from 73.10 to 58.78. By November, 1907,



C. E. Johnston



J. A. Edson

purposes—to a highly developed property. As an under-study of L. F. Loree, it is quite fitting that Mr. Johnston, thoroughly imbued with the principles followed by the chairman of the board and president, should have been recommended by the executive committee to continue the direction of the railroad along its present path of stable management. His elevation to the presidency at this time assumes added importance by reason of the prominent place that the Kansas City Southern holds in L. F. Loree's proposed merger of that property with the Missouri-Kansas-Texas and the St. Louis Southwestern.

The Kansas City Southern, with its 865 miles of line, has the shortest route between Kansas City and the Gulf of Mexico. When Mr. Edson became president in 1905 the line had had a checkered career. It had gone through a receivership and reorganization in 1899, almost

Mr. Edson was able to report to his board of directors that the Kansas City Southern had been placed upon a self-supporting basis.

In Mr. Edson's 22 years of administration the roadbed, structures and equipment have been improved to such an extent that he turns the property over to Mr. Johnston in the best physical condition in its history. When he assumed charge, the ruling grades were 1 per cent or heavier. During 1906 and 1907 Horace G. Burt, a former president of the Union Pacific, was engaged to make an extensive study of the possibility and cost of grade reduction. His recommendations were followed closely by Mr. Edson and today more than 66 per cent of the entire line from Kansas City to Port Arthur has been rebuilt on ruling grades of 0.5 per cent or less.

Under Mr. Edson's direction special attention has been given to the modernization of facilities for the care of

equipment, shops having been constructed at Pittsburg, Kan., in 1907-8 and at Shreveport, La., in 1911-12, and roundhouses at Heavener, Okla., De Queen, Ark., and Leesville, La., in 1908-10. The retiring president has also conducted a vigorous campaign of replacement of wooden bridges with modern steel and concrete structures, with the result that since June 30, 1905, the number of wooden bridges and trestles has been reduced from 599 to 301. The original Kansas City Southern was laid with light rail—56 and 60 lb. per yard—on dirt ballast. In 1926 more than 74 miles of line were laid with 100 lb. rail and 688 miles with rail weighing 85 lb. per yard. Likewise 773 miles of line have been ballasted with a minimum of 6 in. of gravel or chatts during Mr. Edson's administration.

In the period from April 1, 1900, to December 31, 1926, a total of \$30,209,505 was expended for additions and betterments to roadway and buildings, including \$6,159,363 for grade reduction and line changes, \$3,252,298 for bridges, trestles, and culverts, \$3,578,450 for ballast and \$3,547,208 for rail. Other addition and betterment expenditures of magnitude in this period went to improve sidings and shops and enginehouses and to widen cuts and fills.

The Kansas City Southern is conspicuous among the railroads in its territory for its high average tractive effort of freight locomotives. Expenditures have constantly been made for heavier power until the average tractive effort of freight locomotives has been increased from 48,118 lb. in 1918 to 66,010 lb. in 1926.

The Kansas City Southern originates only about one third of its traffic and the problem of the management has always been, as stated by Mr. Edson's predecessor as early as 1905, to develop through traffic by exchange with connecting lines,—a purpose that could become an accomplished fact only by establishing and maintaining friendly relations with connections at all points where traffic could reasonably be interchanged. In 1905 about 73 per cent of the traffic consisted of business to and from connecting railroads. Largely as a result of the weak position which the road occupied in competitive traffic, shippers had been allowed to be slow in handling their cars. The average car movement in 1905 was about 20 miles per day. Within two years, due to the insistence upon quicker handling by shippers, the average car movement was increased to 34 miles per day. In 1926 the average car mileage per day was 45.5.

A few statistics show the road's steady development of traffic during Mr. Edson's administration. Revenue ton miles have increased from 997,916,269 in 1907 to 1,432,558,736 in 1917 and to 1,733,662,983 in 1926. Though not essentially a passenger-carrying line, revenue passenger miles increased from 34,741,195 in 1905 and 56,446,653 in 1907, to 83,033,166 in 1917, although they decreased to 48,997,290 in 1926. Gross earnings have risen from \$9,084,332 in 1907 to \$12,410,965 in 1917 and to \$21,921,947 in 1926, while net railway operating income has increased from \$2,455,339 in 1907, and \$4,028,956 in 1917 to \$5,929,587 in 1926.

Earnings for 1927, as shown by the latest report available—that for the first 10 months—compare favorably with those of 1926. Total revenues for the first 10 months of 1927, including the Texarkana & Ft. Smith, were about 1 per cent greater than for the same period in 1926, with revenues of \$18,566,797 in 1927 and \$18,424,774, in 1926. Operating expenses also increased about 1 per cent in the first 10 months of 1927 over the corresponding period in 1926. The net railway operating income for 1927 of \$4,108,498 represents a decrease of about 4 per cent from the income for the same period of 1926 of \$4,295,924. At the same time the operating

ratio for the 10 months of 1927 was 66.5 per cent, slightly higher than that of the first 10 months in 1926 which was 65.6 per cent.

Mr. Johnston's Railway Experience

Mr. Johnston was born on October 30, 1881, at St. Elmo, Ill. He entered railway service at the age of 16 years in the engineering department of the Chicago, Paducah & Memphis (now part of the Chicago & Eastern Illinois). After a short period of service with the St. Louis Southwestern and the C. & E. I. he became an assistant engineer on the St. Louis-San Francisco in January, 1900. In February, 1903, he was appointed a resident engineer on the Missouri Pacific, where he remained until June of the same year when he returned to the Frisco as an assistant engineer of maintenance of way.

In October, 1906, Mr. Johnston entered the service of the Kansas City Southern as a locating engineer. He was advanced successively in August, 1908, to office engineer; in June, 1909, to division engineer, and in January, 1911, to chief engineer. In February, 1917, Mr. Johnston was appointed general manager occupying that position along with that of vice-president, to which office he was elected on May 20, 1924, continuously since that date.

Mr. Johnston belongs to the younger school of railway officers who are rapidly assuming positions of leadership. His attitude toward the problems of management today is typified by such measures as the organization of an independent association of maintenance of way, telegraph, signal, bridge and building foremen, by the establishment of a system appeal board to deal direct with employees on questions of discipline, wages and the interpretation of working agreements, and by the painting of the interior of the Pittsburg shops with white enamel to provide a brighter and more cheerful environment for the employee.

Mr. Edson's Career

Mr. Edson was born on February 14, 1854, at Sylvania, Ohio, and entered railway service when 13 years of age as a telegraph operator on the Lake Shore & Michigan Southern (now part of the New York Central). He became a telegraph operator on the Union Pacific in 1872, advancing successively to train dispatcher and then to trainmaster. In 1886 he was appointed chief dispatcher of the Iowa and Dakota division of the Chicago, Milwaukee & St. Paul. In 1887 Mr. Edson was appointed a division superintendent on the Missouri Pacific and in 1889 he became superintendent of the Texas division of the St. Louis Southwestern where he remained until July, 1892, when he was promoted to superintendent of the entire system. In the following year he was elected general superintendent and second vice-president of the St. Louis Southwestern of Texas and general superintendent of the Cotton Belt and its subsidiary, the Tyler Southeastern. From June 25, 1899, to January 1, 1903, Mr. Edson served as general manager of the Kansas City, Pittsburg & Gulf and its successor, the K. C. S., then becoming manager of the Denver & Rio Grande. He became general manager of the Cincinnati, Hamilton & Dayton on October 15, 1904, where he remained until his return to the K. C. S. as president on June 1, 1905. During the period of federal control of the railroads Mr. Edson was federal manager of his own railroad, the Kansas City, Mexico & Orient, the Missouri & North Arkansas and the Midland Valley and for a portion of that time federal manager also of the Houston, East & West Texas and the Vicksburg, Shreveport & Pacific.

Railroad Consolidation from the Shippers' Standpoint*

By R. C. Fulbright,
Chairman Legislative Committee, National Industrial Traffic League

THE subject of consolidation of railroads is not new. It has agitated the minds of bankers, investors and others ever since railroad transportation became a practical success. In the early history of the development of our transportation system, mergers of railroad interests from time to time were given prominence in the public prints, but attention was directed more to specific individual cases than to any general trend. Consideration of such mergers was usually confined to the financial aspects of the transactions. During this period there were numerous amalgamations of small independent lines of railroad which had been promoted in many cases by public or private groups without adequate experience or ability to develop efficient transportation systems. Through these amalgamations the foundations were laid for nearly all of the present-day large railroad systems.

Sherman Act and Consolidation

It was not until the early eighties that public attention began to be focused upon consolidation of and agreements between railroad corporations. The public aspect of consolidations had theretofore been largely ignored and in its inception during the eighties it was largely confined to the benefits which the public conceived should be continued through the preservation of competition between various railroad companies. This preservation of competition was recognized as desirable by the public even before the Interstate Commerce Act was passed. Inter-corporate relations and financial acquisitions of railroad corporations were potent factors in bringing about the demand for anti-trust legislation. This demand culminated in the passage of the Sherman Act July 7, 1890, in which combinations in restraint of trade or acquisitions of control which were calculated to restrain competition in interstate commerce were prohibited by law and severe penalties were pronounced.

It is significant that the passage of the Sherman law did not materially deter the process of consolidation of railroad properties. Many great systems were built through amalgamations of various properties after the passage of the Sherman Act just as some had been developed before its passage. A study of the development of our transportation systems during the 20 years prior to the passage of the Sherman Act as contrasted with the development in the twenty years succeeding its passage, shows that progress of railroad consolidations was as great in the latter period as in the former. The Sherman Act, of course, placed restraining influence upon certain kinds of consolidations, but it did not prevent the building up of general railroad systems. The subject of consolidations at that time was more or less prominent in the public mind but principally from the standpoint of the preservation of competition. There was no popular demand from any quarter for legislation which would proclaim a policy as to the consolidation or amalgamation of railroad properties. These were

considered to be private affairs of the railroad owners with which the public had little concern.

It is interesting to note that progress of railroad construction was not visibly affected by the Sherman Act. During the 20 years prior to the enactment of the law the operated mileage of railroads in this country increased approximately 100,000 miles while in the 20 years after its passage the increase was approximately 86,000 miles. From 1890 to 1920 a large number of major railway systems were developed through various processes of amalgamation. The Rock Island system, the Frisco system and various other western railway systems were developed after passage of the Sherman Act.

In fact, we do not have to go beyond New England to find interesting examples of this. In 1890 the Boston & Maine owned 315 miles of main line and operated 1210 miles, while in 1920 it owned 1731 miles and operated 2258 miles. The New Haven in 1890 owned 141 miles of line as contrasted with 1233 miles in 1920. It operated 525 miles in 1890 and 1986 miles in 1920. During that period it built up through leasing and obtaining stock control or other control various small lines so that to a large degree the system was developed subsequent to the enactment of the anti-trust law.

Competition in Service

The Sherman law, as previously stated, was in part a recognition of the desire of the public to maintain competition between various railroad systems. With the development of railroad rate regulation competition in rates has become of relatively small importance but the desire to preserve competition in service has been thoroughly ingrained in the public mind. On all occasions either before or since the Transportation Act of 1920, where large groups of shipping interests have passed upon the question of the public interest in railroad consolidations they have given expression to their desire to preserve in a substantial degree competition between various railroad systems.

It is difficult for one who is not engaged in handling traffic problems for shipping interests to understand the character and importance of competition between railroads. Not only does competition preserve a more efficient service in handling commodities expeditiously and safely but it affords a greater variety of avenues of commerce. Furthermore, through competition the soliciting departments of railroads perform numerous important services for shippers in keeping the shipping public informed as to the benefits to be had under rate adjustments and in facilitating the movement of commerce at the lowest possible cost. A very large part of the technical service of working out most desirable routings and channels of movement is performed for the shippers by the solicitation agencies and the traffic departments of our great railroad systems. This is a distinct public service which was conspicuous by its absence during the period of government control and perhaps our experience in government control demonstrated more effectively

* From an Address before the Associated Industries of Massachusetts, at Boston, Mass., on October 19, 1927.

than anything else, the importance of this branch of service and the importance of free competition.

The third period in the history of railroad consolidations begins with the enactment of the Transportation Act, 1920. Here for the first time the attempt was made through legislation to provide for a general policy with respect to consolidations and to provide for public regulation of consolidation programs. In order that we may understand the present problem it is necessary to examine the conditions existing at the time the Transportation Act was passed. At that time there were numerous lines of railroads being cast back upon their owners with a record of heavy deficits and with the prospect of enormous expenditures because of the tremendous increase in labor and material costs. The existence of these conditions impressed upon the public mind the thought that there was a major problem of weak transportation systems which might fail entirely and break down our transportation machine if they could not obtain relief through combination with stronger lines. Various devices were resorted to in the law in order to meet the weak line problem. One of the most important of these devices was the provision of a broad power in the Interstate Commerce Commission to regulate the divisions between railroads and the people of New England are thoroughly familiar with the benefits which have been derived pursuant to this legislation. Another device was a provision for recapture of excess earnings of strong lines to be used in establishing a fund for the purpose of assisting and financing weak lines. This provision has not resulted in practical benefit to the weak lines.

The third device was the promulgation of a law under which the Interstate Commerce Commission should work out a plan for the consolidation of all of the railroads of the country into a limited number of systems under certain guiding principles laid down in the law among which, it is noteworthy, the preservation of competition was incorporated as a major requirement. Pending the working out of the plan for consolidation the commission was given jurisdiction over petitions of railroads for acquisition of control of other railroads through stock ownership or otherwise. This regulatory law is still on the statute books but it has operated in many cases to restrict rather than to facilitate consolidations.

The Weak Line Problem Exaggerated

It was not long after the passage of the Transportation Act until it was found that the weak line problem was not being solved so efficiently as the framers of the law had hoped. Some of our statesmen conceived the idea that the law should be strengthened by making consolidations compulsory and giving to the Interstate Commerce Commission power to require the consolidation of weak lines with strong lines as the Commission might consider in the public interest. The late Senator Cummins was strongly impressed with this desire and introduced measures to bring this about. In his study of the subject Senator Cummins, like others, obtained an exaggerated idea of the weak line problem. This idea grew out of the fact that many railroad corporations showed an alarming lack of sufficient earnings in their annual reports to the commission but in many cases the railroads are subsidiaries of large and strong systems and were amply taken care of through the ability of the parent lines to meet the deficits. Again other lines were classed as railroad corporations but were in fact plant facilities and had no particular interest in increasing their railroad revenues.

Generally speaking, there has been no demand by the public for any set program of consolidations or for any

law which would compel the consolidation of railroad properties. On the other hand, the public has not opposed the development of great railroad systems through such processes so long as there is preserved a substantial modicum of carrier competition. A good illustration of this may be had by reviewing the action taken by various bodies. For example, the National Industrial Traffic League has several times defined its attitude.

The legislation of 1920 focused the public attention upon railroad consolidations as it had not been before. The hearings set down by the commission upon the question of adopting a tentative plan of consolidations stimulated a great deal of public investigation and public agitation of the subject. This agitation has been fomented by various agencies having some particular object in view and it has resulted in numerous and varied theories as to a policy of railroad consolidations. I think it safe to say that the theories as to railroad consolidations are as numerous as the proverbial cures for rheumatism and perhaps equally ineffective. The difficulty is that consolidations must be considered according to the conditions existing in each particular case and no rule-of-thumb will apply to the subject as a whole or to the country as a whole.

What the Shippers Think

Perhaps it was because of the numerous statements made as to various theories of consolidation that your body conceived the idea of a debate upon the subject of consolidations on this occasion. You have chosen one of your eminent New England students of finance to discuss this subject, thinking that perhaps we would have a lively debate of conflicting theories between this gentleman and the speaker. I have only had some brief communications with the other speaker but generally speaking we find ourselves in agreement as to the legislative policy to be adopted for the future. No doubt, he can express this much better than I but I am going to tell you briefly what many shippers today think should be done by Congress at the coming session.

First of all we believe that the present legislation has proven inadequate but we are in favor of public regulation of proposed consolidations. We believe the Interstate Commerce Commission is the proper body to consider these questions. We believe that the law with respect to a plan for consolidating the carriers into a limited number of systems should be repealed and that adequate and ample legislative machinery should be provided to enable consolidations to be worked out successfully where the commission, after public hearing, concludes that these consolidations will be in the public interest and that they will not substantially eliminate competition in service between common carriers.

We do not favor a declaration of policy of the law in favor of consolidations for the reason that this smacks of legislative compulsion and runs counter to the play of natural economic processes. Some slight modifications in the bill on this subject which was introduced at the last Congress will meet what we conceive to be the great public need of today. A bill along these lines is being prepared for introduction at the next session of Congress and we understand that it will have the support of railway executives, railway investors and the shipping public. The enactment of such a law will take us away from particular theories of consolidation and will leave the regulatory body free to pass upon the merits of a particular application and apply to it the remedies which the situation may warrant and at the same time it will not deprive the owners of railway properties the right to initiate and undertake further amalgamations or acquisitions of railway properties.

The Seasonal Problem in Cost Accounting*

Becomes such because many items of cost are higher in months when traffic volume is less

By Andrew Sangster
Consulting Accountant, New York

THE period of time most generally adopted in cost accounting systems for determining and comparing the results of operations is the calendar month. Cost of production for the month includes all material and labor directly chargeable to product manufactured in that month. In all large manufacturing industries the factory burden is charged at standard rates applied to appropriate units of production or, if this is not done in the costing system, at least the estimating or pricing department may thus allow for burden. In effect this is to charge factory burden for the month in proportion to volume of production in the same way as material and labor. Based on a certain level of prices, manufacturing costs—both direct and indirect—can, therefore, be represented in a cost system as varying month by month substantially in proportion to output; hence the standard or average unit costs of products derived therefrom are not materially affected by fluctuations in volume of production. It will be noted that the product costs are determined currently for each month; that is to say, they are determined concurrently with production, and are available, if the need arises, as a basis for adjustment of current prices. It may also be pointed out that costs in a manufacturing industry are specific to products or to classes of products for the practical reason that the principal elements of cost, viz: material and labor, can be directly assigned to the respective products.

In the case of a railroad it is not practicable to determine from the operations of any month representative costs of transportation concurrently with the rendering of the service. This is due to the fact that seasonal variations in the volume of traffic are not reflected in the monthly operating costs, except to a limited extent only. Moreover, freight operating costs cannot be directly related to commodities or classes of commodities. Even wages of employees directly engaged in transportation of freight traffic are joint costs affecting simultaneously many different classes of commodities. It will be apparent from these facts that the cost problems of a railroad are radically different from and much more intricate than those of a manufacturing industry.

Because of its great significance in relation to costs it will be instructive to devote some attention to the economic factor of seasonal demand, and particularly to its effects on the respective cost problems of manufacturing industries, local public utilities, and the railroads. As to economic policy generally, it is axiomatic that plants must be employed as continuously as conditions will permit in order that operations may be carried on with the greatest possible economy. A manufacturer adjusts his schedule of production so that he can at all times meet the demand but with the monthly output distributed

over the year as evenly as may be practicable. Of course, he endeavors to do this with the lowest possible investment in inventories,—otherwise he would be merely substituting one form of excess capital for another. His problem, therefore, is to determine the relationship between plant capacity and inventory volume which will permit the fullest utilization of the plant and at the same time limit his investment of working capital in raw material and finished product to a safe minimum. On the other hand, a public utility must invest a large amount of capital in fixed plant and equipment so as to be in a position to furnish the maximum service demanded at any time without unreasonable delay. The effect of seasonal demand on the problem of costing will be more fully appreciated from a consideration of specific cases.

The Automobile Industry

An outstanding example of pronounced seasonal demand is to be found in the automobile industry. Car deliveries are at their lowest level generally during the winter period. But in the spring months the opposite condition is reached, for deliveries are then at maximum volume, the peak showing around April or May. This is succeeded by a much lower level of deliveries during the summer and fall months with a secondary peak occurring about the middle of that period. Yet the production figures show that while the factory output moves along the same general trend as do the sales to users, the high and low points of production are not nearly so wide apart. This is because the manufacturer has mapped out a program for production which is adapted to seasonal demand without the extreme fluctuations of the latter. To develop that program it is necessary for him to make a careful forecast of probable prospective demand, having in mind the type and model of cars to be offered, the extent of publicity which is to feature their introduction to the public, the prices to be asked, and the probable response which will be forthcoming for the particular products in competition with similar products of other manufacturers. On the basis of this forecast of volume and rate of production, and with the budget for selling activities laid down, standard rates are established for indirect manufacturing costs and for commercial and other expenses, including even return on investment in the case of some companies. The effects of volume fluctuations in production are thus reduced to within comparatively narrow limits; and since the factory burden is uniformly absorbed each month at standard rates, the unit production costs are substantially uniform except there should arise a change to new levels in material and labor prices which, if large enough to warrant it, may be given weight in a modification of the standard or average figures at which these elements are taken into process costs.

Among local public utilities the seasonal demand does

* Other articles on this subject by the same author have appeared in the *Railway Age* of December 10, page 1157 and the issue of December 24, page 1269.

not vary so widely as that noted in the previous case. There is a trend of increase or decrease one month with another depending on the class of utility and on the time of the year. In electric lighting utilities, for example, the volume of business is greater in winter than in summer, with the spring and fall business marking transitional stages between the two levels. The characteristic feature of the lighting business is the diurnal variation represented by two pronounced peaks, one in the morning and the other in the evening. To utilize the plant more continuously during the day the demand must be diversified by promoting the use of energy for commercial purposes. It is well known that the development of the sale of power for commercial uses has been one of the chief factors in the extraordinary growth and prosperity of electric light and power utilities.

The rate schedules of any of the larger companies reflect the widely diversified uses for which energy is now sold to consumers. But the more diversified the demand, the more intricate becomes the problem of equitably distributing the costs among classes of service. This is because in the electrical industry we have to deal with joint costs. And we find that it is not a matter of simply averaging the joint costs among consumers, because many economic factors are involved, each of which should be given its due weight. Such in principle at least is the basis upon which class rates are fixed by regulatory commissions. The costs may be classified first, according as they relate to (1) consumer cost (initial cost of service) and (2) output cost (kilowatt-hour cost) with various sub-classifications and refinements in each case. Theoretically if not practically, these costs are to be distributed over classes of service, but the several factors above mentioned must be taken into consideration. The most important is the load factor or ratio of average to maximum demand at the central station. If the maximum demand is taken as equivalent to the capacity of the plant, the load factor expresses the ratio of actual use in a period of time to the greatest available use in that time. A high load factor means lower costs per unit of output. Any distribution of costs, if it is to be accurate and reliable, must be based on an analysis covering a period that will be ample to reflect average operating conditions, because electrical costs do not vary in proportion to the energy output each month, except in one or two classes of expense. It will be evident from these considerations that class costs in the electrical industry cannot be developed month by month as product costs in the manufacturing industries can be determined and applied.

Railroads

The electric light and power business and the telephone business afford two of the best examples wherein the service must be furnished immediately on demand. This means that plant and facilities must be sufficient to carry the peak load. The investment is fixed at that capacity and cannot be restricted to a smaller amount as in a manufacturing plant where the output may be stored in an inventory in anticipation of demand. The transportation of freight by railroads is fundamentally subject to the same economic condition. Efficient transportation service means that it must be prompt and reliable at all times, in other words that the plant and equipment must be ready and adequate to handle and transport with reasonable despatch the maximum volume of freight offered by shippers. It is not the purpose of this discussion to quote statistics showing how the railroads must maintain a standard of efficiency with respect to available facilities, but the following excerpt from the "Review of Railway Operations for 1926," issued by the Bureau

of Railway Economics, will best illustrate the true effect of this requirement on the investment in fixed capital:

"The number of stored locomotives in 1926 ranged from a minimum of 3,841 on November 15 to a maximum of 5,978 on June 15. These surplus locomotives, the majority of which were good for immediate service and were a potential reserve of motive power for the haulage of freight and passengers, represented the continuance of a guarantee from the railways to the public that the transportation situation continued satisfactory, and would be protected at all times."

"The number of surplus cars ranged from a minimum of 79,016 in October to a maximum of 310,155 in January. The margin of freight car supply over car needs, in terms of car surplus, averaged well over 200,000 cars during the year."

When we turn to a consideration of the use made of railroad facilities at different periods throughout the year, we find that there is a decided variation. In the winter months the volume of traffic moving over the railroads is at its lowest. There is a general trend of increase throughout the spring and summer which continues on into September. In the month of October the volume of traffic is at a maximum, following which there is a rapid decline to the Winter level. Reckoned in ton-mile units, the statistics show that for the year 1926 the volume of traffic at the beginning of the year averaged about 38 billion net ton-miles per month, in the peak month of October it was over 48 billion net ton-miles, and in December 40 billions. The figures for January, 1927, show that the traffic had declined to the seasonal total of 39 billion net-ton miles. It is evident therefore that the peak traffic is more than 25 per cent greater than the traffic moving in winter. Reckoned in car loadings the seasonal variation affecting certain important classes of commodities is very much greater than is indicated above, but the respective peaks and valleys are not coincident. The seasonal trend shown for the year 1926 is typical of railroad experience during the last five years at least, and may therefore be regarded as a periodically recurring feature in the transportation of freight.

Railroad Operating Costs

In view of the varying demand which the railroads must accommodate we have to inquire how far operating costs reflect that condition. For if costs are not substantially proportionate to volume of traffic, the average or unit operating costs of any one month, while furnishing an index of conditions in that month, will not be representative of average conditions. Obviously that part of the fixed charges consisting of taxes, insurance, administrative expenses, and return on investment does not vary in proportion to seasonal movement of traffic. Depreciation is partly attributable to wear and tear; but we have the assurance of experienced railroad engineers that the predominant factors in depreciation are obsolescence, inadequacy, decay due to age or exposure to weather, destruction by storms, changes required on account of growth or public relations, and other causes not associated with direct use of the plant. Repairs of track and roadway are taken care of most extensively in spring and summer when traffic is not congested and weather conditions are favorable. Those railroads which are subject to the rigors of winter must incur heavy expenditures to keep the roadway and switches clear of snow and ice; yet the season is one of relatively low traffic density. Repairs to structures and buildings are only remotely connected with seasonal traffic conditions.

Repairs to equipment are fairly uniform throughout the year; this is to be expected if repair shops are to be operated on the most economical basis; and the policy of constant activity is made practical by the large reserve of equipment carried during the greater part of the year. Maintenance and depreciation charges represented about 46 per cent of the total railway operating expenses of Class I railroads for the year 1926. Transportation ex-

penses include important items of cost such as fuel, water and other supplies for locomotives, train supplies and expenses, and station supplies and expenses which depend to some extent upon the amount of traffic handled. The item of fuel might be taken as the best instance of a dependent variable in railroad costs; yet the statistics show that the consumption is relatively higher in winter than in the summer months.

Again the ratio of locomotive-miles to train-miles is highest in winter for many of the roads, though the average train-load at that season of the year is below the average for the entire year. The other principal items in transportation costs are represented by wages. Here we have to deal with a large force of employees constituting the operating department which is distributed over the various divisions of the road, most of them trained by years of experience in their special vocations. It is hardly necessary to state that this organization of trained employees must be maintained on a permanent basis, irrespective of seasonal changes in the volume of traffic, if the roads are to function efficiently. The same condition holds with respect to expenses incurred for the other departments of a railroad, that is for the traffic, engineering, legal, accounting, executive, and others outside of the operating department. For the year 1926 transportation expenses of Class I railroads accounted for 47 per cent, and traffic, miscellaneous, and general expenses for the remaining 7 per cent of the total railway operating expenses.

We conclude from the foregoing that the expenses of the railroads charged to operations month by month are very largely independent of the monthly variations in volume of traffic handled. As a matter of fact it will be appreciated that a railroad represents a large organization of many departments; and considerations of economy and efficiency in operation require that their expenses be equalized over the year as far as this can be practically attained. Supplies for mechanical operations will of course vary in amount as the volume of business fluctuates; but we know that an increase in traffic can be handled with a smaller percentage increase in cost, and that a decrease in traffic is not accompanied by a proportionate reduction in costs. But if operating costs are so largely independent of monthly variations in volume of traffic, it follows that the average costs per unit of traffic must vary month by month. In view of those fundamental facts we conclude that whatever method may be devised for developing costs by classes of commodities or of service, it must cover a period which will produce representative or true average operating costs. Assuming however, that a satisfactory and reliable system of costing could be devised to that end, it would serve no useful purpose whatever to attempt to translate the monthly operating costs as at present reported by account classifications into class costs on the basis of those representative average costs. For, it is evident, in view of the varying volume of traffic, that the system costs would in general differ substantially from the actual costs in any single month; as a matter of fact class costs would have as significant relation to any particular month, derived as they would be from average conditions.

All that would be accomplished by such an experiment would be merely some kind of a reconciliation between two statements of costs each month, an object which, though quite unnecessary, would involve a formidable amount of the more expensive grade of accounting work. As stated in a previous article, the better method is to develop a cost system along independent lines.

Freight Yards Discussed By Mr. Hannauer

FREIGHT classification yards was the subject of the paper, illustrated with the stereopticon, which was delivered by George Hannauer, president of the Boston & Maine, before the New England Railroad Club on December 13. Mr. Hannauer, who was a pioneer in the use of car retarders in freight yards (at Chicago) while devoting his attention largely to the economy to be accomplished by the use of this improvement, discussed, in considerable detail, the general principles of yard design and operation, both with and without such improvements as the hump, to secure the most scientific use of gravity, and the retarder to reduce the cost of man-power.

He began with some notes about the present business of the Boston & Maine, at Boston, where 18 freight trains, arriving from the west between 8 p. m. and the next morning, are switched usually in an average time of about 1 hour, 30 minutes, to each train. Taking the record of a certain day, the best time for any train was 29 minutes.

The best performance to be expected in a flat yard, Mr. Hannauer estimated as 30 cars per engine hour; this in a yard with two leads, the proper gravity, and No. 7 frogs, 20 classification tracks and an average of 1½ cars per cut.

Among the yards briefly described were those at Markham (Chicago) on the Illinois Central; Selkirk, N. Y., on the New York Central; Gibson, Ind.; and Clearing, Ill., (Chicago). The Clearing yard of the Belt Railway was built in 1915, is 5½ miles long and has a car capacity of 10,000. There is a double main track around the yard. There are humps for movement in two directions and the switches are all handled from one tower. In this yard, provision is made for working four streams of cars over the hump at one time, two streams in each direction; but usually only two streams of traffic are kept in operation, one in each direction.

With this arrangement and throwing two classification yards together, there has been made a record of 4,157 cars a day, equal to 2,079 in each direction. This work is done with an average of 68 car riders and 24 engine crews.

The Boston & Maine has lately completed or nearly completed, four new yards, two near Boston, one at Mechanicville, N. Y., and one (flat) at White River Junction, Vt. All except the last are to have car retarders.

The speaker explained the theories on which the efficiency of the hump and the retarder depends; the right grades, the right curves, adequate attention to weights of loaded and empty cars, and the use of hot oil on car journals in cold weather; pneumatic tubes and teletype machines for quick transmission of information; loud speaking telephones for broadcasting and floodlights to facilitate night operation.

The modern yard must be made to function with the necessary rapidity to keep pace with modern road speeds of heavy freight trains.

The new hump yard on the New York, New Haven & Hartford at Hartford, Conn., is the first in the United States to have both retarders and switches managed by two operators.

At Gibson, Ind., there is an inspection pit at the crest of the hump and it is claimed that, in using this, improved inspection is accomplished.

Bessemer & Lake Erie "Safety First" Car

THE Bessemer & Lake Erie recently remodeled one of its parlor cars for service in safety extension work over the system. In many respects this car marks an advanced step in the work of the safety



Interior View of the Bessemer's "Safety First" Instruction Car

department of the railroad in carrying the message of "Safety First" to a large number of people. It has been arranged as an auditorium or assembly room for the purpose of safety first meetings and lectures on safety, sanitation and welfare work. It is equipped with a projector for showing both moving pictures and lantern slides which can be operated from either the car lighting circuit or city current.

Of Wood Construction

The car is of wood construction, the total length being 64 ft. 1 3/4 in. The exterior is finished in white enamel, while the trucks, fixtures and lettering are in black. Both sides of the car are stenciled with appro-

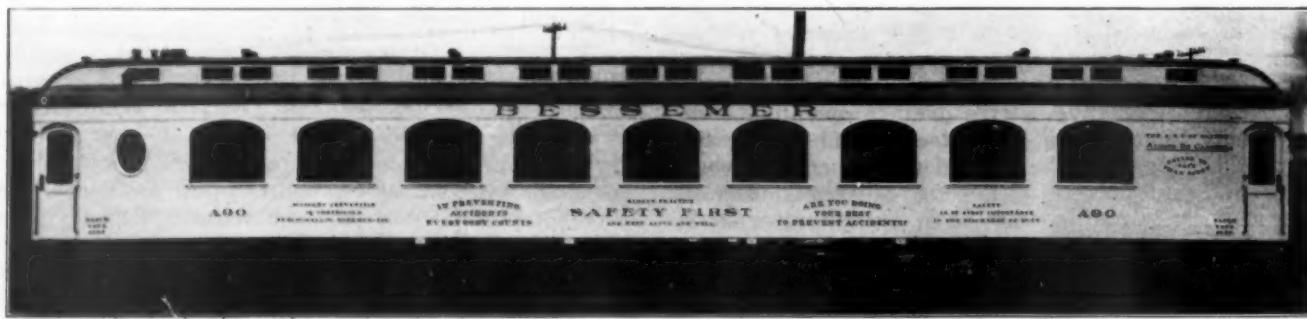
Crossing Gate Adapted For Automatic Control

A NEW type of automatic electric crossing gates has been in service for over two months on the Chicago, North Shore & Milwaukee near Libertyville, Ill., the special feature of which is the provision in the construction whereby a vehicle striking the gate in the lowered position does not break off the arm, but simply



Views Showing Special Features of Mechanism, the Crossing Protected, and Gate Arm Pushed Aside Without Injury to Car

swinging it aside. This is accomplished by hinging the gate on a movable head that revolves in a horizontal plane on ball bearings, two helical springs keeping the



Parlor Car Remodeled by the Bessemer & Lake Erie for a "Safety First" Instruction Car

priate safety slogans, as shown in one of the illustrations. The assembly room is 8 ft. 8 in. wide and about 41 ft. in length and has a seating capacity of 64 persons.

The safety department of the Bessemer recently made an initial trip with this car stopping at various points along the line, during which over 2,100 people attended the meetings and viewed the pictures and exhibits. The safety department reports that lost time accidents with the company dropped from 625 in 1923, to 134 in 1926.

head in position normally. Another feature of interest is the arrangement whereby, if the gate should be lowered on top of a passing vehicle, the gate arm bounces up clear of the top, the mechanism that lowers or raises the arm having a clutch feature that allows the arm to be stopped when striking the obstruction. The mechanism, however, continues its cycle of operation and on the return movement, brings the arm back to its correct position. Small cables can also be provided on the sides and

bottom of the arm to assist in throwing the gate aside without injury to a car.

Two gates are used at the crossing, one located at each side of the railroad to the right of the highway when approaching the tracks. The gate arm is only 10 ft. long, extending across the normal traffic side, but only about half way across the full width of the highway. A warning bell and flashing red lights on the gate arm warn the driver of an approaching vehicle, that the gates are about to be lowered and the lights continue to burn as long as the gate is down. These lights on the arm are so hooded as to shine both ways on the highway, but not down the track. Therefore, when the gates are down, an indication of a row of red lights all of the way across the highway is presented to a driver of an approaching automobile.

Reason for Short Gate

One reason for using the short gate is that, if the gates should be lowered with a vehicle on the tracks, the driver can readily get off the crossing by passing around the end of the gate on the wrong side of the highway. Likewise, in case of a failure of any sort that leaves the gates in the lowered position, the highway is not blocked but drivers could get through by making an S curve around the two gates.

All of these special features contribute to the practicability of controlling the gates automatically by the approaching trains by means of regular track circuits. The gate is operated by a small electric motor from a-c. power. Although a d-c. motor can be furnished, using a storage battery as a standby source of energy in case of a power failure.

To Secure Record

In order to secure a record of the operation of this new gate, the North Shore has installed a recording indicator having a chart graduated in 15-minute periods. The circuits, including six dry cells, is connected through a mercury tube on the gates. When the gates are lowered, the mercury in the tube completes the circuit which operates the needle indicator. Thus, a record is made automatically of the time each train passed for which the gate operated. Not a single failure has occurred in the two months the signal has been in operation, although about 60 trains are operated over this crossing each day.

These gates were developed and manufactured by O. L. Vincent, Chicago.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading during the week ended December 17 amounted to 868,162 cars, a decrease of 76,234 cars as compared with loadings in the corresponding week of last year and of 101,576 as compared with 1925. Loadings of livestock and of ore were larger than a year ago. Coal loadings amounted to 173,273 cars, a decrease of 57,406 cars from the corresponding week of last year. Loadings in the Northwestern district were larger than a year ago. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

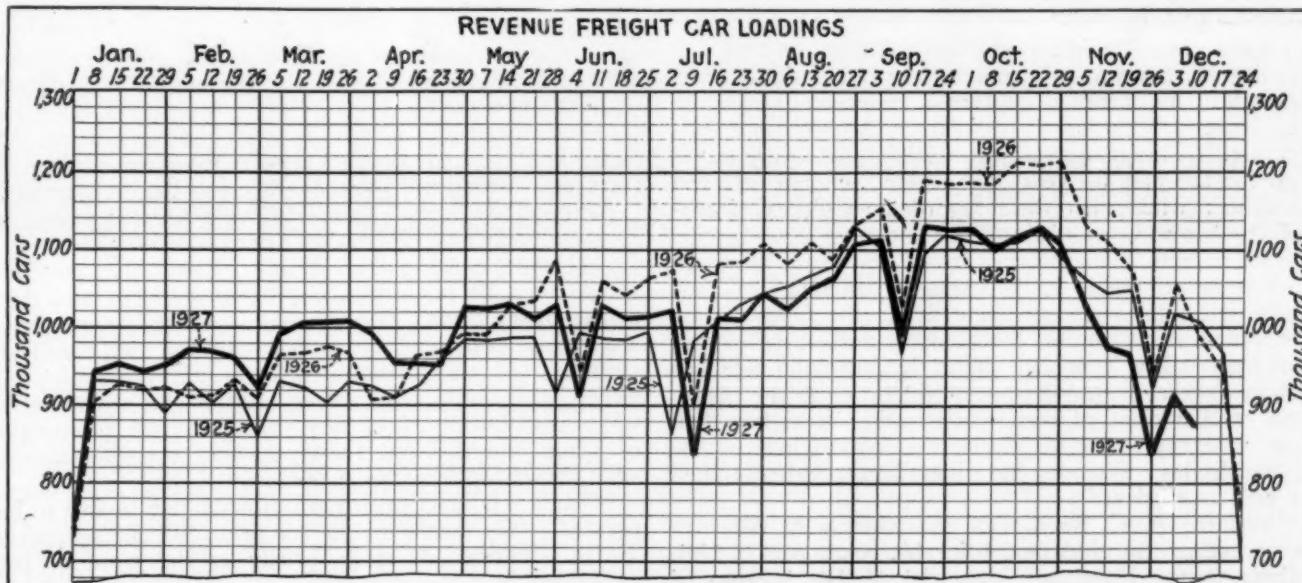
WEEK ENDED SATURDAY, DECEMBER 17, 1927

Districts	1927	1926	1925
Eastern	188,393	213,354	214,816
Allegheny	172,540	198,458	196,151
Pocahontas	47,991	57,862	56,591
Southern	141,466	155,036	160,394
Northwestern	107,536	100,097	114,503
Central Western	136,961	141,443	145,244
Southwestern	73,275	78,146	82,039
Total Western	317,772	319,686	341,786
Total all roads	868,162	944,396	969,738
Commodities:			
Grain and grain products	44,752	45,716	54,043
Live stock	32,299	30,299	34,420
Coke	173,273	230,679	187,271
Forest products	9,973	11,783	16,438
Ore	53,714	58,460	69,536
Miscellaneous	8,892	8,769	11,280
Merchandise, L. C. L.	246,140	246,837	253,003
December 10	299,119	311,853	343,747
December 3	877,600	992,455	1,008,696
November 26	918,237	1,051,219	1,020,839
November 19	840,803	937,844	923,206
Cumulative total, 51 weeks	50,946,044	52,338,058	50,523,091

Car Loading in Canada

Revenue car loadings at stations in Canada in the week ended December 17 totalled 67,778 cars, an increase over the previous week of 967 cars and an increase of 4,129 cars over the same week last year.

Commodities	Total for Canada			Cumulative totals to date	
	Dec. 17, 1927	Dec. 10, 1927	Dec. 18, 1926	1927	1926
Grain and grain products	15,273	15,874	10,892	505,261	492,818
Live stock	2,671	2,860	2,294	120,874	115,315
Coal	9,345	8,492	9,975	358,992	320,251
Coke	628	547	422	18,680	19,189
Lumber	2,547	2,465	2,902	183,961	180,406
Pulpwood	2,263	1,521	2,095	140,522	123,942
Pulp and paper	2,472	2,431	2,351	111,547	118,376
Other forest products	2,505	3,073	2,685	152,327	153,474
Ore	1,597	1,657	1,324	85,585	87,478
Merchandise, L.C.L.	17,081	16,791	16,637	861,985	826,099
Miscellaneous	11,396	11,100	12,072	745,060	719,011
Total cars loaded	67,778	66,811	63,649	3,284,794	3,156,359
Total cars received from connections	34,422	33,767	36,902	1,859,744	1,871,089



Presentation of Harriman Safety Medals

THE three E. H. Harriman Memorial Medals, which are annually awarded under the direction of the American Museum of Safety to those railroads which make the best record in accident prevention during the preceding calendar year, were formally presented at a luncheon at the Biltmore Hotel, New York City, on Thursday of this week. As announced in the *Railway Age* of December 10, 1927, page 1183, the gold medal for the best record for the year 1926 in the group A roads was awarded to the Norfolk & Western; the silver medal for the best record in the group B roads to the Duluth, Missabe & Northern, and the bronze medal for the best record in the group C railroads to the Quincy, Omaha & Kansas City. Arthur Williams, president of the American Museum of Safety, and vice-president in charge of commercial relations of the New York Edison Company, presided at the luncheon and was supported by a number of the officers and directors of the American Museum of Safety.

Mr. Williams, in a brief address, indicated that splendid improvement had been made in the reduction of accidents on the railroads due to defects in or failure of equipment or facilities, but that a lesser improvement had been shown in the reduction of those accidents caused by negligence of employees. This affords, he said, "striking evidence of the importance of education to prevent accidents, due to the failure of the human equation."

That the railroads are to be congratulated upon the improvements they have been making in their safety records is indicated by the following extract from Mr. Williams' address. "Looking at the question of railroad safety from another angle for a moment and taking a bird's-eye view of all kinds of accidents all over the country, perhaps it may not be generally known that since 1911 fatal railroad accidents have decreased from 13 per cent to 6.6 per cent. No other class of accidents, as a group, show anything like this improvement—especially where an industry is concerned. For example, automobile accidents have increased from 2.2 per cent to 17 per cent; accidental falls have increased from 13 to 15.4 per cent; even the common matter of burns (not including conflagrations) shows a decrease of only from 7.7 to 6.2; street car accidents, always comparatively low as a class by themselves, show a reduction from 3.2 to 1.6 per cent."

At the close of his address, Mr. Williams introduced Charles M. Schwab, who made the presentations. Mr. Schwab in his informal and happy way emphasized the importance of the human element in industry and railroading. "This matter of safety has absorbed my attention for the past 30 years," said Mr. Schwab. "I can remember when men were regarded as pieces of machinery, not as human beings. But now we have the new science of human engineering, and I don't care how well a corporation builds its furnaces or machines or railroads, it cannot build satisfactorily, to the fullest measure, unless it also builds for human comfort, safety and happiness. My long experience in industrial life has taught me that we must give consideration to the happiness of that class of men whose rating is higher than that sometimes accorded them—the workingmen of the United States. We must have them happy and contented as well as efficient."

President A. C. Needles of the Norfolk & Western, in accepting the gold medal for his road, paid a high tribute to the Harriman Memorial Medals because of

their effect in inspiring the railroads to "do good railroading, which means, first of all, safe railroading."

W. A. McGonagle, president of the Duluth, Missabe & Northern, in accepting the silver medal awarded his railroad—this is the second consecutive year it has been awarded to that road—said among other things: "I believe that every railroad can reduce their lost time accidents at least 50 per cent, if they organize to secure this result. Under our system, the superintendent of safety reports directly to the president and as that officer believes in safety, it is not difficult to see why we have been so successful in saving human life and limb. I therefore sincerely hope that our great trunk lines, as well as all other lines, will promptly organize an effective safety department and put this department on a basis where it can act promptly on suggestions made by the employees for bettering the conditions that cause accidents, and educating the employees to look out for themselves, their fellow employees and the public. It will be a happy day for all when the railways take this subject more seriously than they have done in the past and when the employees realize that their officers are serious when they try to surround them with safeguards and are willing to spend a reasonable amount of money to help the employees to protect themselves."

J. P. Cummings, superintendent of the Quincy, Omaha & Kansas City, accepted the medal awarded to his company. He stressed the importance of immediate investigation being given to personal injuries by the heads of the departments, such investigations being considered of as much or more importance than the investigation of property or material damaged by train or other accidents.

Special Award for Union Pacific

The Union Pacific had been awarded the gold medal for two consecutive years—1924 and 1925. The American Museum of Safety presented to that road a special certificate of merit, because of its great accomplishments in the safety field. This was accepted for that system by its president, Carl R. Gray, who indicated in a pleasant way that the other roads would have to travel pretty fast if they expected to retain the lead in accident prevention.

R. H. Aishton, president of the American Railway Association and a member of the medal award committee, commented upon the importance of the Harriman Memorial Medals in stimulating competition among the different railroads in the matter of safety prevention.

Dr. J. H. Parmelee, director of the Bureau of Railway Economics and a member of the committee on awards, made a statement of the basis upon which the awards were made and commented upon some of the difficulties which confronted the committee in deciding upon the winners.

James Speyer, banker and treasurer of the Museum of Safety, commented upon the importance to all concerned, employees, managements, the public and the investors, of right relations between the employees and the managements. Each one of these elements suffers when there are misunderstandings and strikes. Everything possible should be done to bring about better relations and this matter of improving safety is one in which the men and the managements can mutually co-operate with excellent results. He also commented upon the value of customer ownership of the public utilities and advocated a wider distribution of railway stocks and the promotion of plans whereby the employees might participate in such ownership to a greater extent.

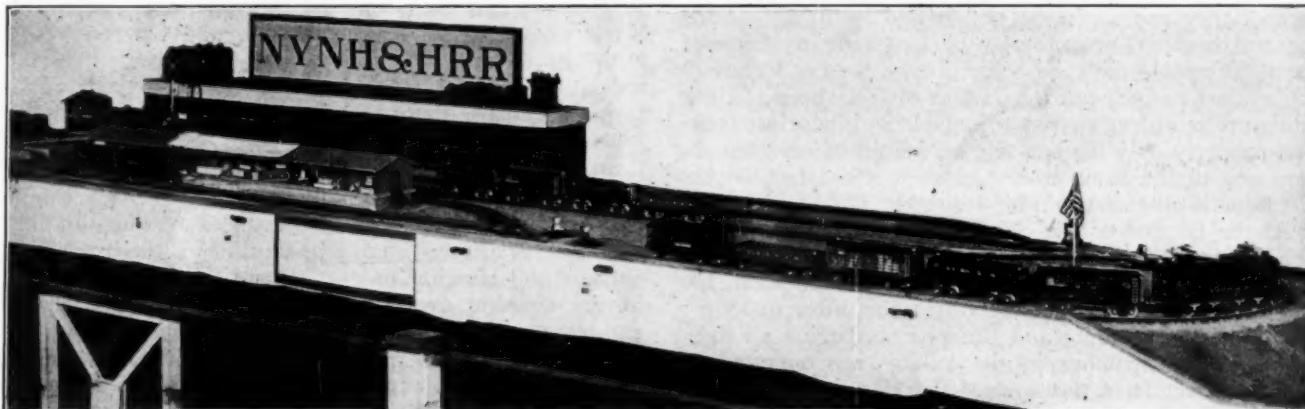
Mrs. E. H. Harriman was unfortunately unable to be present at the luncheon, but her personal representative, F. D. Underwood, spoke briefly at the close of the program.

A Novel Railroad Model

ONE of the most up-to-date and ingenious of the railroad exhibits prepared this year for state fairs is that of the New York, New Haven & Hartford which was shown at the Eastern States Exposition at West Springfield, Mass., last month, and two pictures of which are reproduced herewith. Primarily designed to convey to merchants and manufacturers an

public about 13 hours a day, requiring two sets of men. Each operating crew consisted of a control man for the passenger line or yard, a control man for the freight yard, a car uncoupler and a coupler of cars. Added to these four there were a mechanic or maintainer, and a supervisor, giving necessary attention throughout the day and evening.

The control man, theoretically performing his duties in the signal cabin, stood with his hands at the left of that



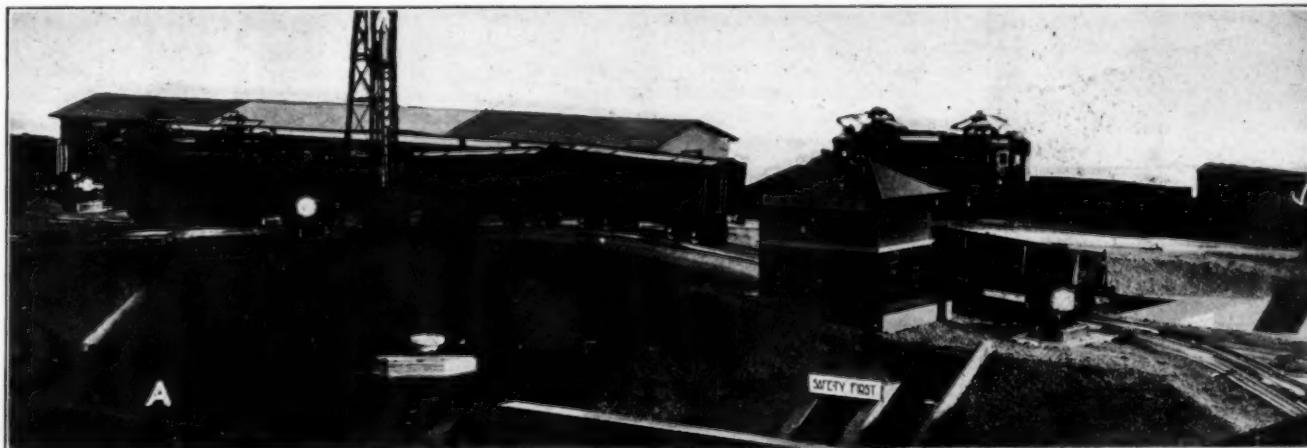
Toy Railroad with Hump and Car-retarders

intelligent idea of the freight facilities of the road and of the foresight and skill with which these facilities are managed, the display included also a model of tracks and cars, showing passenger train operation (on the four-track electrified section of the road) and full-size samples of signals in operation, both semaphores and light signals. Automatic train-control was simulated in an instructive way, and car-retarders (with a hump track) were made to retard in a manner "as natural as life"; and thus the spectators were given an insight into

diminutive structure, the keys and circuit closers by which he opened and closed electric circuits being grouped at the point marked *A* in the illustration.

The ground model consisted mainly of two parts, one a section of main line electrified tracks, and the other of a freight classification yard, including a hump for gravity switching; classification tracks, departure yard, transfer station for less than car load shipments, and stub-end tracks for waiting locomotives and cabooses.

The two sections are connected by means of a half



Freight Transfer Shed Three Feet Long

two of the leading recent innovations in railroad service. The scheme is carried out by means of small cars and electric locomotives moving on tracks of $2\frac{1}{4}$ in. gauge. The passenger cars are 13 in. long by $5\frac{1}{2}$ in. high, and the other vehicles are of proportionate size.

This exhibit was in charge of the freight traffic department of the road, but the movement of the locomotives and cars, as well as the preparation and maintenance of the plant and all apparatus was the work mainly of the signal department. The exhibit was kept open to the

girder bridge, so that the model trains may be run from the main line to the classification yard and vice versa.

The freight classification yard aroused the greater interest on the part of spectators. The freight train, designed to illustrate (to shippers) the regular 100-car trains by which the New Haven economizes power, consisted of only 15 tiny cars. This train comes in on a receiving track, drawn by an electric locomotive which outwardly is a replica of the motors in service between New Haven and New York. The motor is uncoupled,

is switched to another track, is moved to the rear of the train and then pushes the cars over the hump, one by one.

Use Car Retarders

As the cars pass the apex of the hump, they start down the incline by gravity, and the man at the tower sets the switches to guide the car to one of the five classification tracks, which are labeled for various destinations such as Maybrook, Harlem River, Boston, etc. As the cars reach the track to which they have been assigned, they are slackened and halted by means of the car retarders. These consist of longitudinal strips of metal, alongside the rails, which brake the car by pressing against the sides of the flanges of the wheels. These miniature retarders are not adjustable and therefore function properly only for one size or weight of car; but the cars are all the same weight, and so the effect on the spectator is all that could be desired.

At the far end of the classification tracks are connections leading to the departure track, where a new freight train is made up and "departs" for a distant point, finally arriving back at the receiving track, after making a circuit of the exhibit; and the process begins all over.

All of the switches in the exhibit are operated by electric power from the tower. The electric motors have pantographs like those of the regular electric locomotives and the overhead wires are supported by a catenary system which is a replica of the main line electrification.

Loaded Carefully

An interesting little detail showing the nicety with which the entire exhibit has been planned is the loading of the freight cars which contain varied commodities, such as coal, lumber and so on. The load of each car is adjusted to the fraction of an ounce so as to be of just the right weight to move down the grade from the

hump at the right speed, as has been above noted.

Included also in the freight terminal exhibit is a transfer house for l.c.l. freight, showing how cars are spotted and goods trucked from one car to another.

Train Control Illustrated

In the "main line" section of the exhibit automatic train control is illustrated and automatic signals are demonstrated, as well as an electric highway crossing flashing signal.

The signals are actual models of automatic block signals. No train proceeds until it receives a clear signal; and immediately on passing the signal the indication changes from green or yellow to red. Two trains are used in this portion of the exhibit, and the spacing between them is controlled by the automatic train control feature.

This feature, like the car retarder, is extremely simple but it is real train control nevertheless. The stopping of a train is effected simply by cutting off the propulsion current and trusting to gravity and the normal friction of the running gear to cause motion to cease at the right place.

In addition to these two main parts, there were included in the exhibit full-size models of modern automatic signals. With these the sequence of normal operations was illustrated through the functioning of a pair of miniature freight car trucks on a piece of track with a gage of about six inches. Two types of automatic signals were demonstrated—a semaphore, and a color light signal.

The full-size highway crossing flashing signal bore a sign which proclaimed that the flashing signal is "on duty 24 hours a day and can be depended upon never to sleep, engage in conversation, or in any way relax its vigilance."



On the Chinese Eastern in Manchuria

Looking Backward

Fifty Years Ago

The Chicago, Burlington & Quincy and the Providence & Worcester [now a part of the New York, New Haven & Hartford] have recently placed in service some 30 iron and steel box cars, those on the former road are about 4,000 lb. lighter in weight than wood equipment.—*Chicago Railway Review*, December 29, 1877.

An unusual task of surveying was performed for the New Orleans, St. Louis & Chicago [now part of the Illinois Central] during July, 1877, when, in order to replace notes destroyed in the Civil War, a continuous line of levels was run over the railway from Jackson, Miss., to Jackson, Tenn., a distance of 358 miles, in less than 11 days or an average of 32½ miles per day.—*Railroad Gazette*, December 28, 1877.

The Attorney General and the Secretary of the Interior have summoned the attorneys of the Union Pacific and the Kansas Pacific for a hearing on the order compelling the Union Pacific to pro-rate its traffic with the latter road. Representatives of the K. P. claim that the law chartering the U. P. contemplated that the K. P. and the Iowa end of the U. P. would be considered branches on an equal footing in regard to business from California.—*Chicago Railway Review*, December 29, 1877.

Twenty-Five Years Ago

Five receiverships were reported for 1902, constituting along with the year 1901 which had only four receiverships, the smallest number of bankruptcies among railroads for any single year since 1881.—*Railway Age*, January 2, 1903.

W. G. Besler, general manager of the Central Railroad of New Jersey, has also been elected vice-president. J. A. Edson, general manager of the Kansas City Southern, has been appointed general manager of the Denver Rio Grande, with headquarters at Denver.—*Railway Age*, January 2, 1903.

Walker D. Hines, vice-president of the Louisville & Nashville, in an address at Philadelphia on December 26, declared it "most dangerous" to make it possible for the Interstate Commerce Commission to fix rates. Such action on the part of Congress would be equivalent to allowing the government to appoint the traffic manager of each railroad, said Mr. Hines.—*Railroad Gazette*, January 2, 1903.

Ten Years Ago

Ex-Senator Joseph L. Bristow, chairman of the Kansas Public Utilities Commission, has presented a substitute plan for unified operation of railways to the Newlands Joint Committee on Interstate commerce. Mr. Bristow proposed a merger of all railroads by the organization of a national corporation with the government actually acquiring the properties as a trustee by the issuance of stock and the gradual elimination of separate organizations so that the strong roads would sustain the weak.—*Railway Age Gazette*, December 28, 1917.

On December 26 President Wilson issued a proclamation taking over control of the railways, effective at noon on December 28 and appointing Secretary of the Treasury McAdoo the director general of railroads. The plan suggested by the President for compensating the railways provides that they shall be guaranteed a net income equal in each case to the average of three years preceding June 30, 1917. In accordance with provisions of the law possession of the railroads is taken in the name of the secretary of war by reason of the necessity of national defense.—*Railway Age Gazette*, December 28, 1917.

New Books

Mechanical Division Proceedings. Being the 1927 proceedings of the session of the American Railway Association, Division V, Mechanical, held at the Windsor Hotel, Montreal, Quebec, June 7 to 10 inclusive. Published by the association. Bound in cloth, 1,268 pages, 5 in. by 9 in., numerous illustrations and inserted charts. Price, single copy, \$5.00 to members of the association; \$10.00 to others.

This book, received from the printers several weeks in advance of the usual time, in spite of substantially increased contents, contains a wealth of valuable information regarding railway mechanical and allied subjects. Under the leadership of Chairman Sillcox, the 1927 convention was notable for the unusual number and high caliber of the men selected to make individual addresses, and all of these addresses are printed in full in the present volume. Nineteen committee reports, several of which are outstanding in scope and method of presentation, are included, together with the discussion following each. Mention may be made of the report of the Committee on Electric Rolling Stock, for example, which fills 160 pages, being the most comprehensive comparison of steam and electric operation yet published. In addition to other important if less spectacular standing committee reports, the reports of two new committees are published, including the Committee on Automotive Rolling Stock and the Committee on Lubrication of Cars and Locomotives. As a reference book and in many respects a textbook of railroad mechanical department operation, the 1927 volume of the Mechanical Division proceedings should receive wide distribution.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

The Eighth Wonder. An illustrated history of the design and construction of the Holland vehicular tunnel, New York City. 64 p. Pub. by B. F. Sturtevant Co., Boston, Mass. Apply.

Railroad Fuel Oil Consumption in 1926, by Arthur H. Redfield. Besides the data for 1926, there is a table on p. 4 showing number of oil-burning locomotives and number of barrels of oil consumed each year from 1908-1926 inclusive. Information Circular No. 6049. 6 p. Pub. by U. S. Bureau of Mines, Washington, D. C. Apply.

Second Special African Railway Number, Railway Gazette, December 5, 1927. The First was noted in the Booklist for Dec. 17. This one has articles, maps and pictures on the Egyptian State, Egyptian Delta Light, Sudan Government, Kenya & Uganda, Nigerian Gold Coast, Sierra Leone, Cape to Cairo, and Franco-Ethiopian Railways together with accounts of the proposed Trans-Saharan, railways in French North, French West and French Equatorial Africa, the Belgian Congo and Italian railways in Africa. Biographies of African railway officers and a directory of African railways by countries are also included. 112 p. Pub. by Railway Gazette, London, England. 2 shillings, sixpence.

Periodical Articles

Flood Control with Special Reference to the Mississippi River: A Symposium. Fourteen articles, each bringing out special points to be considered. Proceedings of the American Society of Civil Engineers, December, 1927, p. 2452-2615.

The Principal Pass Gates of India, by T. Comyn-Platt. Those who like unusual combinations of transportation facilities will be interested in the illustrations of this article showing the Khyber Railway and the Khyber Pass Highway on their respective levels through the pass and in the text describing the "operating conditions" of each. Field (London), Christmas, 1927, p. 8-9.

Odds and Ends of Railroading

When his job of feeding coal into the firebox of engine on the Denver & Rio Grande is finished, Louis R. Wilhelm hastens to his art studio to work with his wife on paintings of western life. The best known painting by Wilhelm and his wife is "Peaceful Nature," shown at the independent artists' exhibit in New York in 1925. It is a mountain scene in the Wagon Wheel Gap country of the San Luis valley of Colorado. In addition to his work in oils, Wilhelm devotes his spare time in summer to photographing mountain scenes in the heart of the Rockies, selecting many of his scenic views while seated in the cab of his locomotive.

But Figuring with a Chinese Slipstick Is Hardly Our Idea of Play

William S. Wollner of the Northwestern Pacific kindly contributes the following true story:

Scene: Pacific Railway Club Meeting.

Place and date: Travelers Hotel, Sacramento, December 10.

Prologue consisting of addresses on high boiler pressures and oil burning furnaces. Frank E. Russell (mechanical engineer, Southern Pacific) steps to the center of the stage to discuss papers.

Voice from rear: "Mr. Chairman, we are taking Mr. Russell at a disadvantage. He is accustomed to making his calculations with a slide rule."

Second voice from the rear: "Mr. Hanlon, manager of the hotel, is an ex-mechanical engineer, maybe he has a slide rule."

Mr. Hanlon. "Yes, I have one. I'll get it."

He disappears and reappears with slide rule 8 ft. long with all figures shown in Chinese.—Uproarious applause from railroad officers, employes and some forty apprentices, who, for the first time, realize that railroading is not entirely all work and no play.

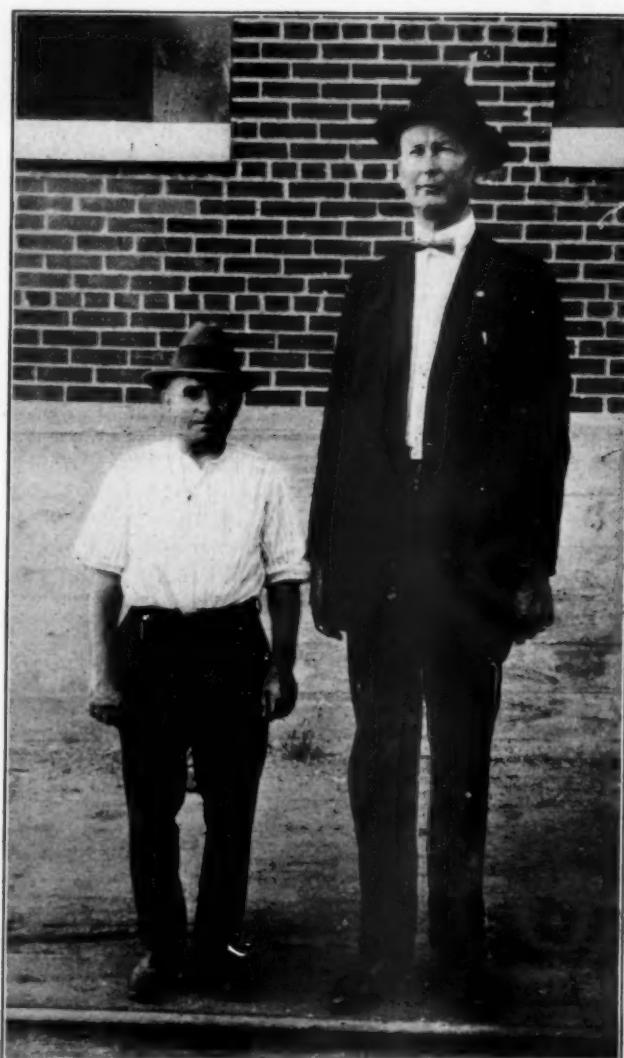


Henry Miller Photo

A Holiday Treat for Some English Kids
Inspecting the New L. M. S. Locomotive "Royal Scot" at Euston Station, London.

The Long and Short of It

The accompanying illustration shows David Strachan and J. A. Snowden, who claim the honors of being the shortest and the tallest railway painter foremen in the country. Singularly enough, they are both employed on the Southern Pacific in

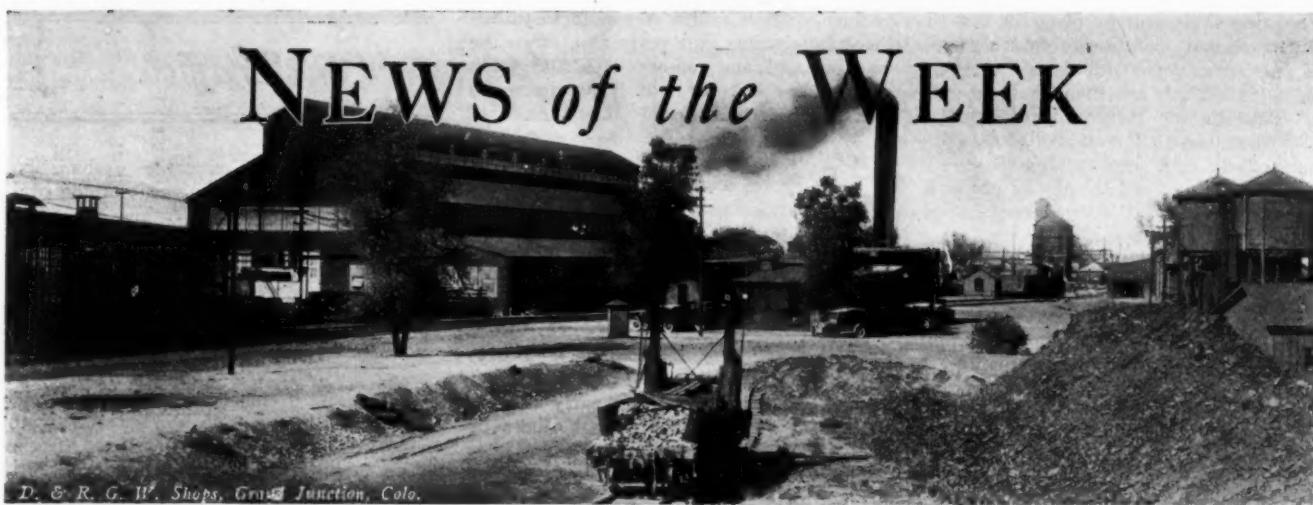


Texas. Strachan, who is 4 ft. 11 in. tall, is paint foreman at the Houston shops, while Snowden, who extends to 6 ft. 10 in., occupies a similar position at the El Paso shops. Despite his diminutive size, Strachan was an officer in the U. S. Army during the war.

But Are You Sure He Wasn't Scottish?

We are indebted to the New Zealand Railways magazine for the following:

In a first-class carriage in Germany an Englishman was observed to put his head out of the window. The train was going fast and a sudden gust of wind blew off his hat. He at once took his hat-box and hurled it after the hat. Then he sat down and smiled on his fellow passengers. The Germans roared with laughter and said: "You don't expect your hat-box to bring back your hat, do you?" "I do," said the Englishman. "No name on the hat. Full name and address on the box. They'll be found together, and I shall get both. Do you see now?" Then those Germans subsided and said they always had considered the English a great and practical nation.



D. & R. G. W. Shops, Grand Junction, Colo.

THE INTERSTATE COMMERCE COMMISSION has granted a further extension of time to May 31, 1928, to the Central of New Jersey in which to complete its installation of automatic train control in compliance with the commission's second order.

A FULL STOP before crossing railroad tracks is now required in Ohio by law, in the case of vehicles transporting explosives. The law (Section 12,533) is addressed to the drivers of all vehicles whether motor or horse-drawn, and names a dozen different commodities which are included in the prohibition; ether, hydro-carbon, turpentine, wet calcium carbide, etc.

A SPECIAL COURT, consisting of United States Circuit Judges Kimbrough Stone and Arba Van Valkenburg, and District Judge C. B. Faris, sitting at St. Louis, Mo., on December 19 granted counsel for the St. Louis & O'Fallon an appeal to the United States Supreme Court from the valuation and recapture findings of the district court which were announced on December 10.

THE BUREAU OF NEW IDEAS established last month by the Pennsylvania Railroad to encourage employees of the company to interest themselves in specific improvements in the service, has received already 650 individual suggestions, some of which, including No. 1, have been found to be of merit and have been adopted. Suggestion No. 1 had to do with efficient and economical use of stationery.

THE PAGEANT which was the leading feature of the "Fair of the Iron Horse" with which the Baltimore & Ohio recently celebrated its centenary, has been filmed for a moving picture exhibition which is to be taken all over the Baltimore & Ohio system, in a special car, for the benefit of the thousands of employees who were unable to attend the fair. In connection with this traveling exhibition, the company is going to distribute to employees 70,000 coins as souvenirs of the centenary celebration.

O'Fallon Case to Supreme Court

A special court, consisting of United States Circuit Judges Kimbrough Stone

and Arba Van Valkenburg, and District Judge C. B. Faris, sitting at St. Louis, Mo., on December 19, granted counsel for the St. Louis & O'Fallon an appeal to the United States Supreme Court from the valuation and recapture findings of the district court which were announced on December 10.

Second Inspection of C. & E. I. Automatic Train Control

The Interstate Commerce Commission has issued a supplemental report upon re-inspection of the installation of the automatic train-stop device of the Miller Train Control Corporation on the Chicago division of the Chicago & Eastern Illinois, finding that the exceptions noted in the original report have been corrected and that all of the requirements of the commission's specifications and order have been met. The former order approved the installation with some exceptions.

Mr. Murphy Moves

Representative Murphy, of Ohio, has introduced in the House of Representatives a bill, H. R. 7901, which, conditionally, would nullify the "stop, look and listen" rule in relation to grade crossings as recently interpreted by the Supreme Court of the United States. The bill provides that in suits arising from accidents at grade crossings between railways and street or highway vehicles no rule shall be adopted or laid down by the federal court contrary to the law of the state, territory or place where such accident occurred, but that the law of the place shall govern.

A Sizable Freight Claim

The Lehigh Valley has paid to a Russian representative the sum of \$984,104.62 in final settlement of the claim of the Russian Government, long pending in the courts, for the loss of munitions destroyed in the great explosion at the Lehigh Valley freight terminal, Black Tom, New York harbor, in 1916. The last defense of the railroad company was that the Russian government no longer had a standing in

the courts of this country, but the Department of State, at Washington, has recognized Serge Ughet as the representative of the Kerensky government and it was he that received the check.

P. R. R. Heroic Service Medals

President W. W. Atterbury, of the Pennsylvania, at the regular meeting of the Board of Directors in Philadelphia on December 28, presented to nine employees of the road, heroic service medals, awarded by the directors in recognition of acts of valor outside the regular line of duty. The recipients in the eastern region are: David Kehoe, Joseph McMahon, Charles H. Price, G. L. Morris, Robert J. Martin. Those in the western region are: Clarement S. Ferguson, Chester H. Fisher, and William Webster; and in the central region, Luis Duris.

B. L. E. Wage Hearings

Hearings are to begin in Washington on January 3 in connection with the arbitration of the demand of the Brotherhood of Locomotive Engineers for a 15 per cent increase in wages on the railroads of the southeast. The United States Board of Mediation has selected as the neutral arbitrators Walter P. Stacey, chief justice of the supreme court of North Carolina, and Leslie M. Shaw, former Secretary of the Treasury. The arbitrators representing the parties, chosen in September, are J. J. Pelley, president, Central of Georgia; W. J. Jenks, vice-president, Norfolk & Western; Alvanley Johnston, grand chief engineer, and S. H. Huff, assistant chief, of the brotherhood.

Alaska Railroad Reduces Its Deficit

Expenses of operation in excess of revenues of the Alaska Railroad in the fiscal year ended June 30, 1927, amounted to \$839,424, according to the annual report of the Secretary of the Interior. Total expenditures on the railroad to June 30 have amounted to \$63,929,016. Progress was made during the year, according to the report, in the plan of completing the line and

modernizing equipment to lower the cost of maintenance and operation in future years. This year was the first in which the deficit from operation was less than a million dollars. Payrolls for 1926 amounted to \$1,914,548, and for 1927 to \$1,856,600, a decrease of 3.3 per cent. Rail revenues showed an increase in 1927 of 43.2 per cent and expenses increased 3.9 per cent.

O'Fallon Order Postponed to April

The Interstate Commerce Commission on December 22 announced a further postponement to April 30, 1928, of the effective date of its order in the St. Louis & O'Fallon recapture case, in which it had ordered the road to pay to the government one-half of the excess earnings as indicated by the commission's valuation of its property. The commission has repeatedly postponed the effective date of the order, pending court proceedings, the last preceding postponement being to December 31. The further extension is to allow time for an appeal to the Supreme Court of the United States from the recent decision of the three-judge special court at St. Louis that upheld the commission's order without examining into the valuation methods involved.

New York State Crossings

The New York State Public Service Commission preparatory to proceeding with its elaborate program of grade crossing removal for the year 1928, has closed the records and discontinued the proceedings in 49 pending projects which, for one reason or another, must be laid aside for the present. Thirteen of these cases deal with locations where the tax valuation of the town was too low to warrant the proposed expenditure; though in five of these cases the crossings have been re-entered in the program for 1928. A large number of cases are discontinued because the local authorities have not yet completed preparatory or auxiliary work which must be attended to before the main work can be undertaken; and in 24 cases the Commission has decided that there is no reasonable necessity for elimination of the crossing at the present time.

June Conventions at Atlantic City

As noted in last week's issue of the *Railway Age*, it has been found necessary to change the date of the Mechanical Division meeting of the American Railway Association to June 20-27, in order that the exhibit of the Railway Supply Manufacturers Association may not conflict with that of the National Electric Light Association, which meets on the Million Dollar Pier earlier in the month. The Purchases and Stores Division of the A. R. A. has changed the date of its meeting to June 20-22. It has been decided to erect a new structure adjacent to and connected with the Million Dollar Pier, in order adequately to house the big exhibit. This addition will be in the nature of a steel structure, approximately 600 ft. long and 116 ft. wide and will un-

doubtedly prove far more satisfactory than the arrangements two years ago, when the machine tool and motor coach and truck exhibits were separated from the main exhibit on the Million Dollar Pier.

R. & L. Historical Society

The Railway and Locomotive Historical Society, which has just issued Bulletin No. 15, from its new headquarters at the Baker Library, Harvard Business School, Boston, Mass., announces that the Society's room at that location is now completed, and is open for visitors. The room is already decorated with 200 framed pictures of historic locomotives and other early railroad data, and all railroad men and others interested in these things are invited to visit the room. The principal article in the present bulletin is one by Charles E. Fisher, president of the Society, on locomotive building at Taunton, Mass.; with a portrait of William Mason, one of the great locomotive designers of America. For fifty years Mason and his neighbor, The Taunton Locomotive Works, were leading builders, the two concerns supplying engines to prominent roads all over the country.

Railways Appeal Firemen's Wage Award

Railways in western territory on December 23, through an appeal to the United States district court of northern Illinois, have challenged the authority of the four members of the reconvened arbitration board to grant a wage increase to firemen, hostlers and helpers. This wage award was made public at Denver, Colo., on December 18, granting partially the employees' demands.

The present petition, signed by W. M. Jeffers, general manager of the Union Pacific, as chairman of the railroads' committee and by H. A. Scandrett (Union Pacific), and K. F. Burgess (C. B. & Q.), as attorneys for the railroads, alleges that the four arbitrators were without power to reconvene as a board of arbitration. The award is null and void since the board had fully and completely discharged all of its duties when it made a "final" announcement on December 5 of its inability to agree.

The six members of the arbitration board met at Denver on November 28 and on December 5 announced that they had been unable to reach an agreement on a wage increase. On December 17, at the instance of the Board of Mediation, with no railroad representatives present the other four members agreed on an award; an increase of 30 cents a day for road passenger firemen and 35 cents for all other employees involved in the arbitration.

The Board of Mediation (Washington), in suggesting that the arbitrators meet a second time, said that it acted upon advice of the Department of Justice.

Fifty-four brotherhood chairmen, representing the men on each railroad involved, met at Denver on December 12, for the announced purpose of voting upon the question of issuing a strike referendum, but they adjourned on December 17 without voting upon the question.

Traffic

The Interstate Commerce Commission has announced a postponement of the oral argument on its investigation of motor highway vehicle operation, recently assigned for January 16 to February 10.

"Winter in New England" the little pamphlet issued by the Boston & Maine to stimulate interest in seasonal sports in snowy northern New England, appears this year profusely embellished with numerous new illustrations. The hotels, catering to winter resort business, now listed in the book, number about 300.

During November, 1927, 559 commercial vessels and 14 small launches transited the Panama Canal. Tolls on the commercial vessels aggregated \$2,369,267, and on the launches \$117, or a total of \$2,369,385. The average amount of tolls paid by each of the commercial transits was \$4,238.40, as compared with \$4,197.74 for October.

The fourth annual meeting of the Midwest Shippers' Advisory Board will be held at the Palmer House, Chicago, on January 12. Besides the regular reports of the commodity committees, business forecasts for the year will be made. W. W. Atterbury, president of the Pennsylvania, will be the principal speaker. Officers for the ensuing year will be elected.

Farm Organizations Oppose Reduction in Iron and Steel Rates

Seven Kansas farm organizations have filed with the Interstate Commerce Commission a petition asking it to suspend a reduction proposed by the eastern railroads in the freight rates on export iron and steel to North Atlantic ports, on the ground that the reductions will substantially affect the revenues of the carriers and should not be allowed to go into effect until the commission has considered the effect on other commodities involved in its general rate structure investigation under the Hoch-Smith resolution, "the purpose of which is to ascertain on a broad record the economic situation of such commodities and the application of fair and equitable rates."

A vital part of the investigation, the petition says, will be the rates upon export grain and grain products and a reduction of rates on such articles as steel might so deplete the carriers' revenues "that the commission would be unable to accord to the products of agriculture that relief which the Congress had in mind when the Hoch-Smith resolution was passed."

North Shore Fares Too Low

Intrastate fares required by state authority to be maintained by the Chicago, North Shore & Milwaukee within the states of Illinois and Wisconsin, which are lower than the corresponding interstate rates, were found to be unduly prejudicial and

unjustly discriminatory in a decision by the Interstate Commerce Commission as a result of an investigation instituted on petition of the railroad. Prior to March 25, 1927, the company's basic fare, interstate and intrastate, was 3 cents a mile, established in Wisconsin pursuant to an order of the Wisconsin commission and in Illinois by order of the federal commission. On that date the interstate fare was increased to 3.6 cents and the company applied to the state commissions for authority to establish the same fare intrastate but the authority was denied because of lack of jurisdiction due to the existence in both states of 2-cent fare laws. The Wisconsin commission advised that it had no objection to the increase if made by order of the federal commission and the Illinois commission registered no objection.

Southern Roads Place Responsibility for New Class Rates on I. C. C.

The southern railroads have filed with the Interstate Commerce Commission a protest designed apparently to locate more definitely the responsibility for the new system of class rates about to be put into effect on January 15 in the Southeast and between the Southeast and Official Classification territory, which puts the rate structure on a "dry-land" basis of mileage scales in place of the old competitive system of rates, in accordance with the commission's findings as a result of its Southern Class Rate Investigation. The protest is directed against language in the commission's order of October 27, which directed the roads to put into effect the new scales to and from points in the peninsula of Florida, in which the commission said that all the respondents except the Atlantic Coast Line, Seaboard Air Line and Florida East Coast "have signified their willingness to accept said findings and have proceeded with the work of carrying them into effect."

The southern carriers respectfully protest that public misunderstanding is likely to result from the phrase "willingness to accept" to the extent that it "may indicate or imply that the findings which have now been translated into tariffs, represent their free choice and, as a consequence, satisfaction therewith." They point out that the position expressed in a letter to Commissioner Eastman dated June 3, 1926, in which objections were made to the proposed basis, has not been changed and that as to the Florida rates particularly their position is the same as that of the three roads that declined to make the commission's findings effective without an order. As to the rate structure as a whole the protest says that the carriers "proceeded in good faith to make effective the commission's final conclusions, without subscribing, however, to the equity thereof. Indeed, with an order denying fourth section relief beyond December 27th, they could not have done otherwise. It may not properly be said that the southern carriers proceeded 'willingly' with respect to any feature of the commission's report, which differed substantially from the carriers' proposals."

Maritime Rates Dispute

Further statements by the spokesmen for the Maritime provinces and the Canadian National regarding the observance of the terms of the Maritime Freight Rates Act passed by the last session of Parliament, were made last week following the issuance by the Supreme Court of Canada of its judgment on the appeal of the railway from the order of the Dominion Railway Board that both traffic "gateways"—St. John, N. B., and Ste. Rosalie, Que.—be maintained open. The Court's decision ordered that the Ste. Rosalie "gateway" be maintained open but not the St. John.

The Canadian National, replying to Maritime critics, on the "gateway" issue, scored Premier J. B. M. Baxter of New Brunswick who, it charged, was not agitating on behalf of the people of New Brunswick, and the latter in a statement issued at the end of last week declared that "the whole question is simply that the Canadian National Railways desires to have a monopoly of traffic within a certain territory. I leave it to the people to judge whether that will produce an entirely healthy state of affairs."

In the course of their statement officers of the Canadian Railways said:

"On the two occasions when the Canadian National endeavored to give effect to its policy, the Board of Railway Commissioners refused the Canadian National the right to cancel joint rates from the St. John and Ste. Rosalie "gateways," the term "gateway" being a popular name and not found in the Railway Act, and during the time the matter has been under discussion, the term "gateway" has been used to such an extent that many have lost sight of the fact that the question is not one of "gateways," but entirely one of rates. It has frequently been stated in the Maritime provinces and elsewhere, that the Intercolonial has imposed upon the people of the Maritimes hardship, in that its distance from points in the Maritimes to Montreal is greater than the distance from the same points to Montreal via the Canadian Pacific and St. John. This is a misconception and a misrepresentation. The Intercolonial from Halifax to Quebec is within a very few miles of the shortest possible distance and this distance has nothing to do with the case and has never been a factor in the making of rates which are based upon the shorter mileage of the route to Montreal via the Canadian Pacific."

"Any possible disadvantage to the Maritimes that may have existed has been removed by the Maritime Freight Rates Act which went into effect July 1, 1927, and reduced by 20 per cent that portion of the haul made by the Canadian National Railways up to the limits of such railways which were fixed at Diamond Junction and at Levis, and whatever happens to rates generally in Canada, the rates between the Maritimes and other points will always be 20 per cent less than the Canadian Pacific rates ordinarily would have been between similar territory."

"In 1927 the matter again came before the Board of Railway Commissioners when the Canadian National filed supplements to their tariffs to cancel through rates with

the Canadian Pacific via Ste. Rosalie and St. John when the whole emphasis was placed on the fact that if joint rates were cancelled, any shipper, any consignee at a local point on the Canadian National in the Maritimes, shipping from a local point on the Canadian National to a consignee located on a private spur track on the Canadian Pacific at Montreal or West, would have to pay in addition to the transportation rate, shipping cost mentioned above, whereas, if it moved it at a through rate, either by way of St. John or Ste. Rosalie, via Canadian National, no such charge would be made. In other words, the Canadian National, instead of being a trans-continental route, would, in effect, become a branch line and a short branch line, of the Canadian Pacific."

Premier Baxter, in his statement, said in part:

"It is a fact that, until the passing of the Maritime Freight Rates Act, 1927, what are called the gateways of St. John and Ste. Rosalie were open. After the passage of that act, the C. N. R. asked to close them. The Railway Commission refused the application. An appeal was taken to the Supreme Court of Canada and the result of that appeal has been that the gateway at Ste. Rosalie remains open while that of St. John is closed. How, under these circumstances, it is possible to say that the C. N. R. has not been trying to change the policy pursued for many years. I cannot possibly see, nor do I see why the question of gateways was involved in the Maritime Freight Rates Act, 1927.

"This act was passed by the present Dominion government for the purpose of implementing that portion of the Duncan Commission report dealing with this subject, and was, I thought, an absolute keeping of good faith on the part of the Dominion government. It was something that the business men of the Maritime Provinces received with a great deal of satisfaction, and I think justly so. The government hasn't made any effort to change the act or to lessen its effects, but the C. N. R. management has done all that it possibly could to minimize the effect of what the government granted. That is what I am finding fault with, and it is what the business men of the Maritime Provinces are finding fault with."

The next move, it is expected, will be from the Maritime provinces whose representatives in the House of Commons will at the coming session of Parliament, which opens on January 26, press for an amendment to the freight rates legislation of last session to provide for the opening of the St. John, as well as the Ste. Rosalie gateway.

THE NEW YORK, NEW HAVEN & HARTFORD has ordered from the Union Switch & Signal Company, an electric interlocking, nine working levers, for the Connecticut River Bridge, Saybrook, Conn.

THE WABASH has ordered from the Union Switch & Signal Company a mechanical interlocking for Jacksonville, Ind., 41 working levers.

Foreign Railways

Color Light Signals on Southern of England

The Southern Railway of England has announced, according to recent press dispatches, that color-light signals are to be substituted for semaphores extensively throughout the company's lines, the proposed expenditures for the work amounting to £150,000 (\$750,000). Large numbers of color-light signals have already been installed on the company's lines in and around London.

New Sleeping Car Service on the Trans-Siberian

Sleeping car service is now to be available to passengers using the Russian Trans-Siberian railroad, according to a reported agreement made between the Russian railroads and a European sleeping car company, says a report to the Department of Commerce from Commercial Attache

C. E. Herring who is located at Paris.

Tickets across the Russian continent to Japan, China and Vladivostok may be purchased at the Paris office of the sleeping car company, covering the entire trip for both railway fare and sleeping car accommodations. The sleeping-car company pays to the Russian railroads both its share of the actual railroad fare and the price of the sleeping car accommodation. Its reason for selling these tickets at no profit is said to be the wish to maintain the through service from Paris to the Far East.

In making the transcontinental trip the sleeping-car company operates its own cars as far as Niegereloge on the Polish-Russian border. At this point the change of train is necessary and the service from there across to Manchuria is handled by the Russian railroads. In Manchuria the company again operates its own service to other points further east and south.

the Pullman Car & Manufacturing Corporation. Inquiry for this equipment was reported in the *Railway Age* of November 26.

THE NEW YORK, WESTCHESTER & BOSTON has ordered 15 motor passenger train cars from the Osgood Bradley Car Company. This is an addition to 10 cars ordered from the same builder and reported in the *Railway Age* of December 24.

THE LOUISVILLE & NASHVILLE has ordered 2 baggage cars, 2 combination passenger and baggage cars, 4 middle smoking compartment coaches, 4 coaches, all 70 ft. long and 4 combination passenger and baggage cars 61 ft. 2 in. long, from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of December 10.

Iron and Steel

THE DENVER & RIO GRANDE WESTERN has ordered 20,000 tons of rails from the Colorado Fuel and Iron Company.

THE ILLINOIS CENTRAL has divided orders for 50,000 tons of rails among the Illinois Steel Company, the Inland Steel Company and the Tennessee Coal, Iron & Railroad Company.

Machinery and Tools

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS is inquiring for 1 turret lathe.

THE CHICAGO GREAT WESTERN is inquiring for 3 lathes, 1 shaper and 1 radial drill.

THE ERIE has ordered a 15-ton crane for the Meadville, Pa., shops, from the Niles-Bement-Pond Company.

THE NEW YORK CENTRAL has ordered 3 Ransom grinders, from the Niles-Bement-Pond Company.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for 23 heavy duty grinding machines, 1 single wet tool grinder and 1 open side planer.

THE NORFOLK & WESTERN has ordered a hand centering machine from the Pratt & Whitney plant of the Niles-Bement-Pond Company, also a Long & Allstatter combination punch and shear, from the Niles-Bement-Pond Company.

THE MISSOURI PACIFIC is inquiring for 10 heavy duty lathes, 1 turret lathe, 3 shapers, 2 motor-driven punching and shearing machines, 1 motor driven hack saw, 7 grinding machines, 1 locomotive crank-pin grinder, 1 portable motor driven pipe threading machine, 1 double-head bolt cutter, 1 boring mill and 1 radial drill.

Signaling

THE HAMILTON BRIDGE COMPANY (Canadian National Railways) has ordered from the Union Switch & Signal Company, a mechanical interlocking, 16 levers, for vertical lift bridge, No. 20, over the Welland Ship Canal.

Equipment and Supplies

Locomotives

THE SEABORD AIR LINE is inquiring for 25 switching locomotives.

The Texas & Pacific has ordered 15 2-10-4 type locomotives from the Lima Locomotive Works.

THE SOUTHERN has ordered 55 Mikado type locomotives, 5 Pacific type locomotives and 8 Mallet type locomotives, from the Baldwin Locomotive Works.

THE BOSTON & MAINE has ordered 20, 2-8-4 type locomotives, from the Lima Locomotive Works. Inquiry for these locomotives was reported in the *Railway Age* of April 9.

Freight Cars

THE SWIFT COMPANY is inquiring for 300 steel underframes for refrigerator cars.

THE GULF, MOBILE & NORTHERN has ordered 12 center hinge air dump cars of 30 cu. yd. capacity, from the Koppel Industrial Car & Equipment Company.

THE ST. LOUIS-SAN FRANCISCO is inquiring for 500 flat cars of 55 tons' capacity, 1,500 box cars and 500 automobile box cars of 50 tons' capacity and 1,500 hopper cars of 70 tons' capacity.

THE SOUTHERN has ordered 2,000 hopper cars from the Standard Steel Car Company, 750 hopper cars from the Mount Vernon Car Manufacturing Company, 1,750 automobile box cars from the American Car & Foundry Company and 250 ballast

cars from the Rodger Ballast Car Company. The railroad company also ordered from its own shops, Lenoir Car Works, 500 gondola cars and 250 caboose cars. An inquiry for cars was reported in the *Railway Age* of December 10.

THE ATCHISON, TOPEKA & SANTA FE has ordered 750 stock cars from the Pennsylvania Tank Car Company, 500 gondola cars and 300 flat cars from the American Car & Foundry Company, 500 refrigerator cars and 500 box cars from the Pullman Car and Manufacturing Corporation, 500 automobile cars from the General American Car Company, 500 box cars from the Mount Vernon Car Manufacturing Company and 100 ballast cars from the Rodger Ballast Car Company. In the *Railway Age* of December 24 this company was reported to have ordered 3,850 cars. Inquiry for this equipment was reported in the *Railway Age* of November 26.

Passenger Cars

THE ILLINOIS CENTRAL will issue an inquiry soon for 20 suburban coaches.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS is inquiring for two combination baggage and passenger cars, and two baggage cars.

THE SOUTHERN has ordered 23 combination mail and baggage cars and 2 full postal cars from the Bethlehem Steel Company. Inquiry for this equipment was reported in the *Railway Age* of December 10.

THE ATCHISON, TOPEKA & SANTA FE has ordered 76 passenger train cars from

Supply Trade

Fred Dunlap has been appointed a sales representative of the Gould Storage Battery Company, Inc., with headquarters at Chicago.

James S. Keefe, vice-president of the American Steel & Wire Company, has been elected president to succeed William P. Palmer, deceased.

F. C. Vandervort, Jr., formerly with the Johns-Manville Corporation, railroad department, now represents the Wood Conversion Company, with headquarters at Chicago.

David Newhall, manager of sales of freight cars and auxiliary locomotives, of the Bethlehem Steel Company, with offices at New York, has resigned effective December 22.

A. E. Munch, formerly of the Hewitt Company, Railway Exchange, Chicago, has entered the employ of the United States Metallic Packing Company, Philadelphia, Pa. Mr. Munch will have his headquarters at Chicago.

J. H. Dooling, assistant track supervisor of the Boston & Maine, has resigned to become representative of the Railway Appliance division in the eastern territory for the American Fork & Hoe Company, with headquarters at 1212 Whitehall Building, New York.

J. H. Waterman, formerly superintendent of timber preservation for the Chicago, Burlington & Quincy, has been appointed special agent for the Curtin-Howe Corporation, New York. A photograph and sketch of Mr. Waterman appeared in the *Railway Age* of August 27, 1927, page 404.

The Okonite Company, Passaic, N. J., with sales offices at 501 Fifth avenue, New York City, has purchased the insulated wire department of the Hazard Manufacturing Company, at Wilkes-Barre, Pa., which will be operated as the Hazard Insulated Wire Works, a division of the Okonite Company.

J. E. Lewis, president of the Harbison-Walker Refractories Company, at Pittsburgh, Pa., has been elected a director of the American Arch Company, of New York. The American Arch Company holds a substantial stock interest in the Harbison-Walker Refractories Company, and it is believed that the former company will soon have representation on the Harbison-Walker board.

Harvey Hubbell, Jr., was elected president and treasurer of Harvey Hubbell, Inc., Bridgeport, Conn., at a meeting of the board of directors on December 27, to succeed his father, Harvey Hubbell, Sr., deceased. For a number of years Harvey Hubbell, Jr., has been associated with his father in the man-

agement of the business; no changes in the established policies of the company are contemplated.

The board of directors of the United States Steel Corporation after its meeting on December 27 announced that the chairman of the board is no longer an executive officer of the company. James A. Farrell continues as president of the corporation and becomes its chief executive officer, under the direction and supervision of the finance committee and the board of directors. John Pierpont Morgan becomes chairman of the board, and Myron C. Taylor becomes chairman of the finance committee. The above action was taken to fill the vacancies caused by the death of Judge Elbert H. Gary.

Harvey Hubbell, president and treasurer of Harvey Hubbell, Inc., Bridgeport, Conn., died on December 17. Mr. Hubbell was born in Brooklyn, N. Y., on December 20, 1858. He was educated at the Easton Academy, Easton, Conn., and afterwards attended Eastman's Business College, Poughkeepsie, N. Y., and Cooper Institute, New York City. His natural inclination was to

own invention. About this time he became interested in the development of numerous domestic and industrial electrical appliances, among which are the Hubbell pull socket and the Hubbell interchangeable attachment plug which have since come into universal use. During his lifetime Mr. Hubbell obtained letters patent on more than 300 separate articles and processes and today the plant which bears his name manufactures nearly a thousand devices, parts and articles of equipment.

Obituary

Joseph S. Mitchell, manager of contracting and sales for the diamond drill department of the Sullivan Machinery Company, Chicago, died on December 22 following an acute attack of indigestion.

Trade Publications

SYNTRON ELECTRIC TIE TAMPER.—In a four-page folder issued by the Syntron Company, Pittsburgh, Pa., information is contained relative to the character and advantages of the electric tie tamper manufactured by that company, and the portable gas-electric power plant used with the tamper.

THE TWO-PIECE RETAINING WALL.—The structural and esthetic characteristics of Federal concrete cribbing units for the building of crib retaining walls are explained in an eight-page bulletin recently issued by the Federal Cement Tile Company, Chicago. In addition to detail and erection plans for this construction, there are photographs of actual installations, descriptive matter and a statement of eight claims of merit for this design of wall.

CASE SCHOOL.—The 240-page catalogue of the Case School of Applied Science, Cleveland, Ohio, contains a register of 1927-28 students; a description of the requirements for admission, examinations, fees and expenses, and an outline of the various departments and courses open to entrants. The courses include civil engineering, mechanical engineering, electrical engineering, mining engineering, metallurgical engineering, physics and chemical engineering.



Harvey Hubbell

ward mechanics, and he first became interested in the manufacture and design of printing presses and later in ship building. In 1888 Mr. Hubbell went to Bridgeport and started the manufacture of one or two patented articles of his



Rudolf Kreutzer

A Vienna-Berlin Express Near Vienna

Financial

ATLANTIC & WESTERN.—Reorganization Plan Approved.—The Interstate Commerce Commission has authorized the Atlantic & Western Railway Company to acquire and operate the line of the former Atlantic & Western Railroad Company, which extends from Lillington, N. C., to Sanford, 24 miles, and which was sold at auction on August 1, 1927. The commission has also approved the issuance of \$60,000 capital stock and \$60,000 first mortgage 6 per cent 20-year bonds in payment for the property to be acquired.

CENTRAL OF NEW JERSEY.—Bonds Authorized.—The Interstate Commerce Commission has authorized this company to issue \$5,000,000 general mortgage 4 per cent bonds to be sold to the First National Bank of New York at 96½ per cent, giving an average annual cost to the carrier of approximately 4.16 per cent.

GREAT NORTHERN.—Valuation.—President Ralph Budd has issued a statement regarding this company's valuation, in which he estimates the value of the property to be equivalent to \$198.30 per share of outstanding stock. The statement follows:

"Last month the Interstate Commerce Commission announced the valuation which it has placed upon the physical property of the Great Northern as of June 30, 1915, and a few days ago its value of similar property of the Chicago, Burlington & Quincy, as of June 30, 1917, was announced. These official findings naturally have raised the question as to how much actual value each share of Great Northern stock represents.

"First, it should be understood that the Interstate Commerce Commission valued only the physical property of the Great Northern used for transportation purposes within the United States on June 30, 1915. To compare the value of all of the assets of the Great Northern with the par value of its stock and bonds now outstanding, it is necessary to add to the Interstate Commerce Commission's figures the value of the new property created since June 30, 1915; also other assets which are the property of the company, but are not the kind of assets upon which the Interstate Commerce Commission fixed a valuation.

"These assets include stock of the Burlington and the S. P. & S. They also include Great Northern lines in Canada and all other subsidiaries, some of which are not carrier properties. All of such assets, of course, must be included in any statement of the value of the property which belongs to the stockholders of the Great Northern and are items about which there is no dispute. The following tabulation shows the value per share of Great Northern stock, based upon the final value of the Interstate Commerce Commission for Great Northern and Burlington:

Interstate Commerce Commission valuation of Great Northern as of June 30, 1915, and of Great Northern subsidiaries as of various dates 1914 to 1918 as announced by the commission November 9, 1927.	
a. Road and equipment—Great Northern Ry.	\$383,580,815

b. Road and equipment—subsidiaries valued	7,921,525
c. Miscellaneous physical property Additions and betterments June 30, 1915, to December 31, 1926....	14,783,183
Stock of Chicago, Burlington & Quincy on basis of Interstate Commerce Commission valuation as of June 30, 1917, plus additions since that date, and other investments which give a value of \$261.00 per share; 830,179 shares at \$261.00	110,313,302

Investment in other transportation companies, including Canadian lines, S. P. & S. and Northland Transportation Company	192,685,021
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Total December 31, 1926.....	97,109,837
Par value of Great Northern bonds	19,575,590

Par value of Great Northern stock	\$825,969,273
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Total par value Great Northern stock and bonds.....	\$332,315,215
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Excess of property value above capitalization	248,934,900
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\$581,250,115

Excess of property value above capitalization	\$244,719,158
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Deducting the par value of the outstanding bonds from the total assets leaves \$493,654,058, which is represented by 2,489,349 shares of stock, or the equivalent of \$198.30 per share.

"The government investigation, begun 15 years ago, and now nearing completion, at a cost of approximately \$135,000,000, was conceived on the assumption that the railways were overcapitalized. It has proved that even on the most conservative basis the value of the properties is far more than the total outstanding securities. There is an excess of railway facilities in the Northwest, considering the existing through traffic. The question here is how to earn net income sufficient to insure railway credit strong enough to finance advantageously the necessary improvements to existing lines and extension of branch lines into territory that should be developed. Further reduction in operating expenses seems to be the soundest and indeed the only satisfactory solution until such time as the traffic shall have grown to justify the capacity of the carriers."

INTERNATIONAL-GREAT NORTHERN.—Bonds Sold.—Kuhn, Loeb & Co. have sold \$5,500,000 first mortgage 5 per cent gold bonds, Series C, due July 1, 1956, at a price of 101½ per cent and accrued interest, giving a yield of 4.89 per cent to maturity. The proceeds of the issue are to be used to reimburse the treasury for expenditures for additions and betterments.

LEHIGH VALLEY.—Bonds Sold.—Drexel & Co. and the First National Bank have sold \$12,686,000 4 per cent general consolidated mortgage bonds dated May 30, 1903, and due May 1, 2003, at a price of 92½ and interest.

Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$12,686,000 of 4 per cent general consolidated mortgage bonds, to be sold at 90½ and interest to Drexel & Co., of Philadelphia, and the First National Bank of New York. The proceeds are to reimburse the treasury for expenditures for additions and betterments.

MISSOURI PACIFIC.—Bonds of Subsidiary Company.—The Interstate Commerce Commission has authorized the Missouri Pacific Railroad Corporation of Nebraska to issue \$2,276,500 first mortgage 50 per cent bonds, Series A, to be delivered to the Missouri Pacific in payment for advances.

NEW ORLEANS, TEXAS & MEXICO.—Bonds Sold.—Kuhn, Loeb & Co. have sold \$5,900,000 first mortgage 4½ per cent

bonds, Series D, due 1956, at a price of 98 and interest, giving a yield of about 4.63 per cent to maturity. The bonds are being sold to reimburse the treasury of the company for capital expenditures made out of income (including the acquisition of all outstanding securities of the San Antonio Southern and the Houston North Shore, together owning 74 miles of railroad) and to provide funds necessary for betterments and improvements.

NEW YORK, NEW HAVEN & HARTFORD.—Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$31,000,000 of 40-year first and refunding mortgage bonds, at 4½ per cent, to be sold to J. P. Morgan & Co., at 89½ and interest. The proceeds are to be used to retire the company's debt to the United States, to retire outstanding equipment trust certificates, and to reimburse the treasury for funded debt retired out of free cash.

New Director.—Earle P. Charlton, one of the owners of the Charlton Mills, Fall River, Mass., has been elected a director, succeeding Charles H. Choate, Jr.

SEABOARD AIR LINE.—Acquisition.—The Interstate Commerce Commission has granted authority to the Seaboard Air Line to acquire control of the Georgia, Florida & Alabama Railroad Company by purchase of its common stock and by a lease for a term of 99 years. The Georgia, Florida & Alabama operates a line extending from Richland, Ga., to Carrabelle, Fla., 181 miles, with a branch from Havana, Fla., to Quincy, 11 miles; a total of 192 miles. The present company, known as the Georgia, Florida & Alabama Railway Company has outstanding \$2,685,000 common stock and \$675,000 equipment trust certificates. The greater part of the stock is owned by the estate of Mrs. Cora B. Williams and in accordance with her will, this estate has been devoted to the establishment and maintenance of a hospital for women and children. Under the terms of the will the executors were directed to liquidate the estate within 10 years. Offers of the stock were made to the three carriers connecting with the railroad, but the only one evincing any interest was the Seaboard and that company refused to consider any deal involving a large cash payment. Accordingly, a plan was developed of establishing the new company to be known as the Georgia, Florida & Alabama Railroad Company for the purpose of acquiring the property of the Railway Company. The Interstate Commerce Commission has approved this acquisition and the issuance by the new Railroad Company of \$1,750,000 first mortgage and refunding 6 per cent bonds, \$1,000,000 5 per cent first preferred stock, \$500,000 second preferred stock which is to pay 4 per cent for one year and then 5 per cent thereafter and 10,000 shares of common stock without par value which last is to be turned over to the Seaboard Air Line as part of the lease arrangement. The two preferred stocks are to have voting power only in case of default of dividends or interest.

Commissioner Eastman dissented, chiefly on the ground that the record did not make clear the necessity of establishing a new

company and on the ground that the arrangement would have the effect of substantially increasing the fixed charges of the Seaboard Air Line.

The Georgia, Florida & Alabama has paid only three dividends; one of 1½ per cent and two at the rate of 2 per cent per year. The company, however, has had a substantial net income which it has applied for capital purposes.

WESTERN MARYLAND.—*Acquisitions.*—The Interstate Commerce Commission has approved the acquisition by purchase of capital stock of the Chesapeake & Curtis Bay which owns 2,053 miles of track and 15 acres of land in the Wagner's Point district of Baltimore.

Average Price of Stocks and of Bonds

	Last Dec. 27	Last week	Year
Average price of 20 representative railway stocks..	121.09	121.31	102.48
Average price of 20 representative railway bonds... .	97.08	97.10	92.38

Valuation Reports

The Interstate Commerce Commission has issued final valuation reports finding the final value for rate-making purposes of the property owned and used for common-carrier purposes as of the respective valuation dates to be as follows:

Lancaster & Chester.....	\$515,650	1918
Gilmor & Pittsburgh.....	3,406,000	1917
Oklahoma, New Mexico & Pacific.....	679,000	1918
Ringling & Oil Fields.....	150,500	1918

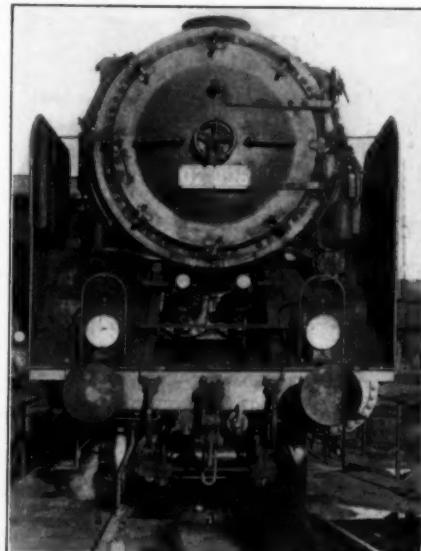
Construction

ATCHISON, TOPEKA & SANTA FE.—Plans have been prepared for construction in 1928 of additional yard facilities at Emporia, Kan. The project will include construction of 16 tracks which will each have capacity of 150 cars, the balance of the tracks to accommodate 60 and 90 cars each. Included in this work will be the construction of track scales, stockyards and yard office.

BOSTON & MAINE.—A contract has been let to the Tredennick Billings Company of Boston, Mass., for changes in the passenger station at Dover, N. H., to accommodate the Portland division office facilities. The Phoenix Bridge Company of Phoenixville, Pa., has been let a contract for the construction of a bridge on the Southern division at Lowell, Mass.

NATIONAL OF MEXICO.—This company plans to transfer its tie and timber treating plant now located at Aguascalientes, Ags., to Acambaro, Gto. By installation of additional machinery it is also planned to increase the capacity of the plant from 98,000 to 260,000 ties per month and equip it for treatment by a variety of methods. Plans have also been prepared for the construction of additional yard tracks and facilities in connection with the construction of a \$1,000,000 repair shop and engine terminal at Monterrey, N. L. The total cost of this work is estimated at \$476,000.

PENNSYLVANIA.—A contract has been awarded to the Cleveland Engineering Company, of Cleveland, O., for dredging the harbor at Ashtabula Harbor, O., which is to cost \$30,000.



Front End of a German 4-Cylinder Pacific

ation in that year from Wesleyan University. He served in France with the transportation corps, A. E. F., from March 28, 1918, until July 28, 1919, as lieutenant, captain and major—lastly as personnel officer of the railway department of the transportation corps.

Financial, Legal and Accounting

A. C. Simmonds, Jr., has been appointed assistant secretary and assistant

Dividends Declared

Akron, Canton & Youngstown.—4 per cent, payable January 1, 1928, to holders of record December 20.

Albany & Susquehanna.—(Special) 2 per cent, payable January 7, 1928, to holders of record December 20.

Belt Railroad & Stock Yard of Indianapolis.—Common, 2 per cent, quarterly; preferred, 1½ per cent, quarterly, both payable January 2, 1928, to holders of record December 22.

Carolina, Clinchfield & Ohio.—Common, ¾ per cent, quarterly; stamped certificates, 1¼ per cent, quarterly, both payable January 10, 1928, to holders of record December 31.

Central Railroad of New Jersey.—Extra, 2 per cent, payable January 16, 1928, to holders of record January 3.

Hudson & Manhattan.—Preferred, 2½ per cent, payable February 15, 1928, to holders of record February 1.

Kansas City Southern.—Preferred, 1 per cent, quarterly, payable January 16, 1928, to holders of record December 31.

Lehigh & Hudson River.—2 per cent; extra, 4 per cent, both payable December 31 to holders of record December 20.

Little Schuylkill Navigation Railroad & Coal.—\$1.00, payable January 14, 1928, to holders of record December 17.

New London Northern.—3½ per cent, quarterly, payable January 2, 1928, to holders of record December 16.

Northern Railroad of New Hampshire.—1½ per cent, quarterly, payable January 3, 1928, to holders of record December 12.

Norwich & Worcester.—Preferred, 2 per cent, quarterly, payable January 2, 1928, to holders of record December 17.

Providence & Worcester.—2½ per cent, quarterly, payable December 31 to holders of record December 14.

Rensselaer & Saratoga.—4 per cent, payable January 1, 1928, to holders of record December 16.

Reading Company.—Common, 2 per cent, quarterly, payable February 9, 1928, to holders of record January 12.

Rome & Clinton.—2½ per cent, payable January 1, 1928, to holders of record December 22.

Texas & Pacific.—Preferred, 5 per cent, annually, payable December 31 to holders of record December 31.

Wabash.—Preferred, Class A, \$1.25, quarterly, payable February 25, 1928, to holders of record January 25.

Officers

Executive

L. R. Powell, Jr., recently elected president of the Seaboard Air Line, has removed his headquarters to Norfolk, Va.

T. F. Joyce, manager of publicity of the Boston & Maine, with headquarters at Boston, Mass., has been appointed assistant vice-president in charge of public relations, industrial and agricultural developments, publicity, advertising and employees' magazine, with the same headquarters, effective January 1.

W. E. Coman, western traffic manager of the Northern Pacific, with headquarters at Seattle, Wash., has been appointed assistant to the president, with headquarters at the same point, effective January 1, succeeding **George T. Reid**, vice-president and western counsel, deceased, as representative of the executive department in the West. **C. H. Winders**, assistant western counsel, with headquarters at Seattle, has been promoted to succeed Mr. Reid as western counsel.

Edgar A. Jones, chief clerk to the vice-president of the Lehigh Valley, has been appointed assistant to vice-president in charge of operation and maintenance, with headquarters at New York. Mr. Jones was born in Wilkes-Barre, Pa., and entered the service of the Lehigh Valley in 1912 after gradu-



E. A. Jones

December 31, 1927

treasurer of the Texas & Pacific, with headquarters at New York.

Orrick, Palmer & Dahlquist, San Francisco, Cal., have been appointed counsel for the Northwestern Pacific, succeeding Eells & Orrick.

R. H. Carleton, auditor of disbursements of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been appointed assistant general auditor, with headquarters at the same point. **A. C. Middleton**, assistant auditor of disbursements, has been appointed auditor of disbursements to succeed Mr. Carleton. **J. M. Gallagher** has been appointed assistant auditor of disbursements, with headquarters at Chicago, replacing Mr. Middleton.

A. E. Clarke has been appointed treasurer of the Camas Prairie, with headquarters at Lewiston, Idaho, effective January 1. Jurisdiction of the Camas Prairie, which is owned jointly by the Northern Pacific and the Oregon-Washington Railroad & Navigation Company, has been extended, effective January 1, to include the line of the Northern Pacific between Spalding, Idaho, and Stites, 66 miles, and between Oro Fino, Idaho and Headquarters, 40 miles. At the same time general headquarters of the Camas Prairie will be established at Lewiston, Idaho. This company now operates 257 miles of line.

Operating

H. H. Sharp has been appointed general manager of the Parral & Durango, with headquarters at Parral, Chih.

L. M. Fry, road foreman of engines on the Oregon-Washington Railroad & Navigation Company at Walla Walla, Wash., has been appointed trainmaster on the First division, with headquarters at Portland, Ore.

J. W. Smith, assistant to the president of the Boston & Maine, with headquarters at Boston, Mass., has been appointed general manager, with the same headquarters. **A. H. Slader**, assistant to the president, with headquarters at Boston, Mass., has been appointed assistant general manager (personnel), with the same headquarters. Both appointments are effective January 1.

The jurisdiction of **F. J. DeGrief**, general superintendent of the Lake Erie & Western district of the New York, Chicago & St. Louis, with headquarters at Indianapolis, Ind., has been extended to cover the Clover Leaf district, with headquarters removed to Frankfort, Ind., effective January 1, succeeding **D. F. Milne**, deceased. **C. E. Vorhis**, assistant superintendent of the Clover Leaf district, with headquarters at Frankfort, has been promoted to superintendent, with headquarters at the same point, and the position of assistant superintendent has been abolished.

Samuel E. Miller, general superintendent of the Boston & Maine, with

headquarters at Boston, Mass., has been appointed assistant general manager (operations), with the same headquarters, effective January 1. Mr. Miller was born on November 25, 1881, at North Acton, Mass., and entered railway service on February 27, 1899, as a relief agent on the Boston & Maine. From March 4, 1899, until September 10, 1903, he was ticket agent and telegraph operator on the same road. At the latter time he became telegraph operator in the train dispatcher's office, and held this position until March, 1907, when he be-

moted to general agent at San Francisco, Cal., succeeding **A. J. Aicher**, deceased.

Sam C. Nash, general agent of the Roscoe, Snyder & Pacific at San Francisco, Cal., has been promoted to assistant general freight agent, with headquarters at the same point.

C. C. Prescott, manager of the Union Stock Yards at Meridian, Miss., has resigned to become live stock development agent of the Chicago & Eastern Illinois with headquarters at Danville, Illinois.

J. W. Byars, general agent in the freight department of the International-Great Northern at Waco, Tex., will retire under the pension rules of the company on January 1 at the age of 70 years after 46 years of service.

John W. Blount, assistant general passenger agent of the Central of Georgia, with headquarters at Savannah, Ga., has been appointed general passenger agent, with the same headquarters, effective January 1, succeeding **F. J. Robinson**, promoted.

Edward V. Murphy, general agent for the New York, New Haven & Hartford at Chicago, has been promoted to general western freight agent, with headquarters at the same point, succeeding **Richard Hackett**, who will resign on January 1 to engage in other business. Mr. Hackett held the title of western freight traffic manager.

J. L. Burnham, assistant general freight and passenger agent of the Northern Pacific, with headquarters at Tacoma, Wash., has been promoted to western traffic manager, with headquarters at Seattle, Wash., succeeding **W. E. Coman**, who has been appointed assistant to the president, effective January 1. **J. L. Norton**, assistant general freight agent, with headquarters at Seattle, has been promoted to succeed Mr. Burnham at Tacoma.

In connection with the reorganization of the traffic department of the St. Louis Southwestern of Texas, the following appointments have been announced: **W. F. Murray**, general freight agent, with headquarters at Tyler, Tex., has been appointed freight traffic manager, with the same headquarters. **S. F. Baker** and **J. C. Winfield**, assistant general freight agents at Tyler, have been appointed general freight agents at that place and **D. S. Brown** has been appointed assistant general freight agent, also with headquarters at Tyler.

B. H. Taylor, assistant freight and passenger traffic manager of the Denver & Rio Grande Western, with headquarters at Denver, Colo., has been promoted to general traffic manager, with headquarters at the same point, effective January 1. Mr. Taylor will have jurisdiction over both the freight and passenger departments. **F. A. Wadleigh**, passenger traffic manager, with headquarters at Denver, will retire on Janu-



S. E. Miller

came clerk in the general superintendent's office. From April, 1912, until May, 1917, Mr. Miller was inspector of transportation, and then became acting superintendent of transportation, which position he held until June, 1918. At that time he was appointed superintendent of transportation, remaining in that position until 1923, when he was appointed superintendent of the Southern division. In August, 1925, Mr. Miller was appointed general superintendent of transportation, and in May, 1926, was advanced to general superintendent, which position he was holding at the time of his recent appointment as assistant general manager (operations).

Traffic

W. E. G. Bishop, division freight agent of the Canadian National at Ottawa, Ont., has been promoted to general agent in Duluth, Minn.

L. W. Baker has been appointed general freight and passenger agent of the Copper River & Northwestern, with headquarters at Seattle, Wash.

Robert E. Dirhold has been appointed general southwestern agent of the Litchfield and Madison, with headquarters at Tulsa, Okla., effective January 1.

E. C. Spalding has been appointed foreign freight agent of the Canadian National, with headquarters at Vancouver, B. C., effective January 1.

C. A. Gerken, traveling freight agent for the Great Northern, has been pro-

ary 1 under the pension rules of the company after completing 39 years of service on the D. & R. G. W.

Charles S. Fay, traffic manager of the Louisiana lines of the Southern Pacific, with headquarters at New Orleans, La., has been appointed traffic manager of the lines of the Southern Pacific in Texas and Louisiana, with headquarters at Houston, Tex., effective January 1. Mr. Fay's jurisdiction is extended to include the Texas lines of which **Charles K. Dunlap** was traffic manager until his resignation effective December 31. At that time Mr. Dunlap will establish his residence in New York. **John T. Monroe**, general passenger agent, with headquarters at New Orleans, has been promoted to assistant traffic manager of the Texas and Louisiana lines, with headquarters at Houston, handling matters relating to passenger traffic. **S. G. Reed**, assistant traffic manager, with headquarters at Houston, will handle matters relating to freight traffic on the Texas and Louisiana lines, with headquarters as before at Houston.

Charles K. Dunlap, who will resign on January 1 as traffic manager of the Texas lines of the Southern Pacific, with headquarters at Houston, Tex., was born on April 8, 1863, at Greenfield, Ohio. He entered railway service when 14 years of age as a commissary clerk in the material department of the Mexican International (now a subsidiary of the National of Mexico) and later served at various points as cashier, clerk, rate clerk and commercial agent. In 1894 he was promoted to general freight and passenger agent, with headquarters at Ciudad Porfirio Diaz, Mex., where he remained until August, 1901, when he was appointed general freight agent of a number of lines which now constitute the Southern Pacific lines in Texas, with headquarters at Houston. Mr. Dunlap was promoted to traffic manager of these subsidiary railroads in September,



Chas. K. Dunlap

1906, a position he has held continuously, with the exception of the period during federal control, until his resignation, effective January 1. During federal control of the railroads Mr. Dunlap served as president of the Morgan's

Louisiana & Texas Railroad & Steamship Company, of the Louisiana Western, of the Lake Charles & Northern, of the Texas & New Orleans, of the Houston & Shreveport, of the Houston, East & West Texas, of the Houston & Texas Central, of the Galveston, Harrisburg & San Antonio and of the Southern Pacific Terminal Company (now parts of the S. P. Texas and Louisiana lines), and of the New Iberia & Northern (now part of the Gulf Coast Lines).

Frederick J. Robinson, general passenger agent of the Central of Georgia, with headquarters at Savannah, Ga., has been appointed to the newly created position of executive general agent, with headquarters at Atlanta, Ga., effective January 1. Mr. Robinson was born on November 14, 1869, at Micanopy, Fla., and was educated in private schools at Columbus, Ga. He entered railway service in 1889 and until 1890, served as a clerk in the local freight station of the Central of Georgia at Columbus, Ga. From 1890 until 1893 he was station



F. J. Robinson

ticket agent at the same place, and from the latter time until February, 1894, served as traveling passenger agent at that point. From February until November, 1894, Mr. Robinson was assistant station ticket agent at Savannah, Ga., and was then appointed city passenger agent at Atlanta, Ga., which position he held until December 31, 1897. From January 1, 1898, until April, 1898, he was western passenger agent at Chicago, and from the latter date until 1899, represented the same road in the movement of troops in the south during the Spanish-American war. He then served as traveling passenger agent at Atlanta, Ga., until July of the same year, when he was appointed chief clerk to the general passenger agent, which position he held until July, 1901. From July, 1901, until August 1, 1916, Mr. Robinson was assistant general passenger agent, and at the latter time was appointed general passenger agent, which position he was holding at the time of his recent appointment as executive general agent. His entire service has been with the Central of Georgia. During federal control Mr. Robinson was a member of the

Inter-Regional Advertising Committee and chairman of the Advertising Committee, Southern region.

Mechanical

J. O. Green has been appointed master mechanic of the Mississippi Central, with headquarters at Hattiesburg, Miss.

H. W. Ostrom, chief chemist of the Chicago, Milwaukee & St. Paul, with headquarters at Milwaukee, Wis., has resigned to become connected with the Aluminum Company of America at Chicago.

Alfred G. Hoppe, assistant engineer of tests of the Chicago, Milwaukee & St. Paul, with headquarters at Milwaukee, Wis., has been appointed engineer of tests, with headquarters at Milwaukee, Wis. Mr. Hoppe will have jurisdiction over all test matters including material inspection and the chemical laboratory.

Engineering, Maintenance of Way and Signaling

Moses Burpee, chief engineer of the Bangor & Aroostook, with headquarters at Houlton, Me., will retire from that position on December 31 at his own request and will be appointed consulting engineer. Effective January 1, **P. C. Newbegin**, maintenance engineer at Houlton, has been appointed chief engineer succeeding Mr. Burpee.

R. A. Sheets, assistant engineer of train control of the Chicago & North Western, with headquarters at Chicago, and **Stanley E. Noble**, general signal inspector, with headquarters at Chicago, have been promoted to assistant signal engineers, with headquarters at the same point, succeeding **R. M. Phinney**, who will resign on January 1 to enter the commercial engineering department of the General Railway Signaling Company, with headquarters at Rochester, N. Y.

Purchases and Stores

Frank E. Cragin, who has been promoted to general storekeeper of the Los Angeles & Salt Lake, with headquarters at Los Angeles, Cal., was born on April 5, 1884, at Bradford, Ill. He was educated in the public schools at Evanston, Wyo., and in a private school at Salt Lake City, Utah, and entered railway service when 13 years old as a helper in the stores department of the Union Pacific at Evanston. He remained at that point until 1903 when he entered the stores department of the L. A. & S. L. as a clerk, serving at various points until 1905 when he was transferred to the train service of the same railroad. In 1907 Mr. Cragin re-entered the stores department at Los Angeles as a material clerk. He then advanced successively to shipping clerk, stock clerk, di-

vision storekeeper and storekeeper in the general store, receiving his latest promotion, that of general storekeeper, on December 7.

Special

Albert D. Barker has been appointed assistant publicity manager of the Boston & Maine, with headquarters at Boston, Mass.

Obituary

Harry B. Spencer, formerly superintendent on the Quebec district of the Canadian Pacific, with headquarters at Ottawa, Ont., died on December 25 at the Civic Hospital there at the age of 71.

James J. Ross, superintendent of telegraph of the Michigan Central, with headquarters at Detroit, Mich., since 1909, died at his home at Grand Ledge, Mich., on December 26, at the age of 73 years.

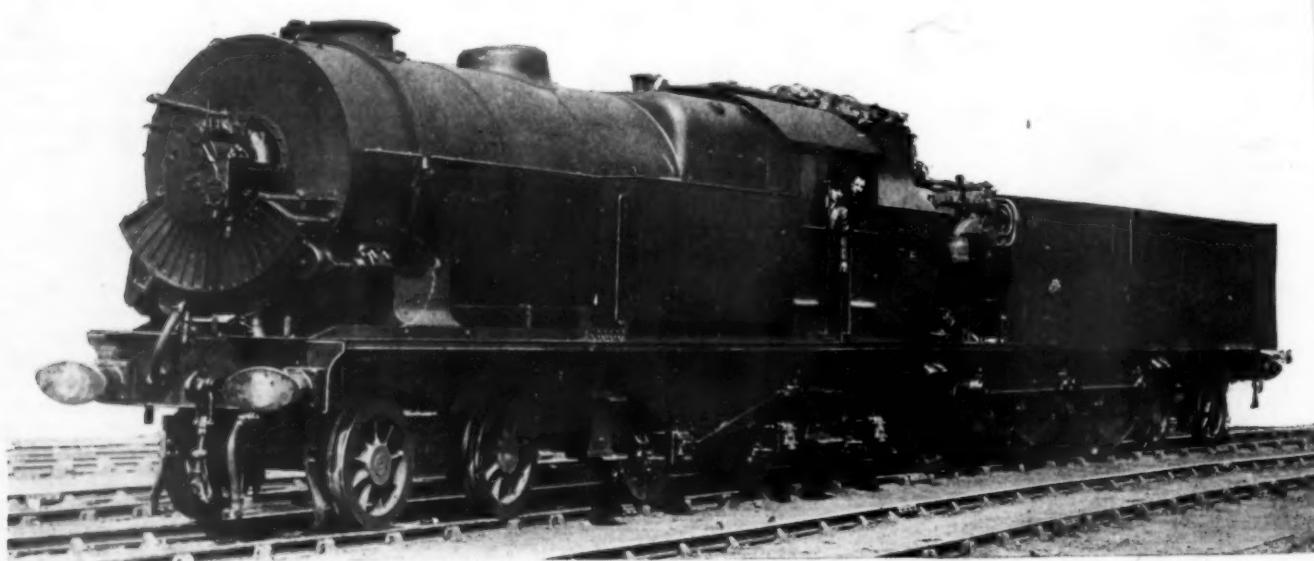
Sidney U. Rhymer, signal engineer and superintendent of telegraph of the Chicago & Alton, with headquarters at Bloomington, Ill., who died on December 20, was born on December 20, 1876, at Union Grove, Ill. Mr. Rhymer had taken a correspondence course in the School of Railway Signaling, Utica, N. Y. He entered railway service in June, 1896, as a section laborer on the Chicago & North Western in the vicinity of Fulton, Ill., and five years later he was advanced to section foreman at Union Grove. In October, 1905, Mr. Rhymer was transferred to the signal department, becoming a batteryman at Fulton where he remained until Febru-

ary, 1907, when he was advanced to signal maintainer at Stanwood, Iowa. On October 1, 1910, he was appointed signal supervisor of the Northern and Southern divisions of the C. & A., with headquarters at Bloomington, being promoted to general signal inspector on January 1, 1913. Mr. Rhymer was promoted to signal engineer and superintendent of telegraph, with headquarters at Bloomington, on June 6, 1919, a position he held continuously until the time of his death.

Harry Flanders, an operating officer of the Missouri Pacific, the Texas & Pacific and two short line railroads from 1891 until his retirement in 1917, died on October 31 at his home in Whiteville, La., at the age of 76 years. Mr. Flanders was born at Camboro, Ont., and entered railroad service as a train dispatcher on the Missouri Pacific at Sedalia, Mo., in 1872. In 1891 he was appointed superintendent of the Central division of the St. Louis, Iron Mountain & Southern (now a part of the Missouri Pacific), with headquarters at Little Rock, Ark., serving in this capacity for the following two years. During 1900 and 1901 he was vice-president and general manager of the Avoyelles (now part of the Texas & Pacific), with headquarters at Marksville, La. In the latter part of 1901, Mr. Flanders was appointed superintendent of the Texas & Pacific at Marksville, where he remained until 1907 when he became purchasing agent and general superintendent of the Opelousas, Gulf & Northeastern. He remained with the latter railroad until it was taken over by the T. & P. in 1915 when he was appointed trainmaster at

Opelousas, La. Mr. Flanders retired from active service in 1917 at the age of 66 years.

Thomas O. Wood, purchasing agent of the Gulf, Colorado & Santa Fe, with headquarters at Cleburne, Tex., who died on December 10, was born on August 20, 1850, in Salop county, England. He entered railway service in March, 1872, as a night ticket clerk on the Kansas Pacific (now part of the Union Pacific), at Lawrence, Kan. For the following 12 years he served consecutively in this position, as clerk in the land department and as clerk in the general superintendent's office. In March, 1885, he became a clerk in the stores department of the Union Pacific at Omaha, later being advanced to chief clerk at the same point. Mr. Wood entered the service of the Atchison, Topeka & Santa Fe on August 17, 1887, when he was appointed chief clerk of the stores department at Topeka, Kan. Later he was promoted to division storekeeper at Las Vegas, N. M., and on August 25, 1890, he was again promoted to general storekeeper of the G. C. & S. F., with headquarters at Galveston, Tex. On January 11, 1898, Mr. Wood was again promoted to purchasing agent, a position he held for the next 20 years until his appointment during federal control as tie and timber agent of the Southwestern Region of the United States Railroad Administration, with headquarters at Dallas, Tex. With the return of railroads to private control on March 1, 1920, Mr. Wood resumed his position of purchasing agent, with headquarters at Cleburne, which he held continuously until his death.



Wide World

Ljungström Turbo-Condensing Locomotive for the London, Midland & Scottish Railway Built by Beyer, Peacock & Co., Ltd., Manchester, England

This locomotive is now undergoing tests in express service between Manchester and St. Pancras (London). An average speed of 54.8 m. p. h. was maintained on a test run May 20, 1927; maximum speed attained 67 m. p. h.; maximum tractive force, approximate, 38,000 lb.; maximum speed, approximate, 75 m. p. h. at a main turbine speed of 10,000 r. p. m.; horse power of main turbine, 2,000 hp.; boiler pressure, 285 lb. per sq. in.; diameter of driving wheels, 63 in.

